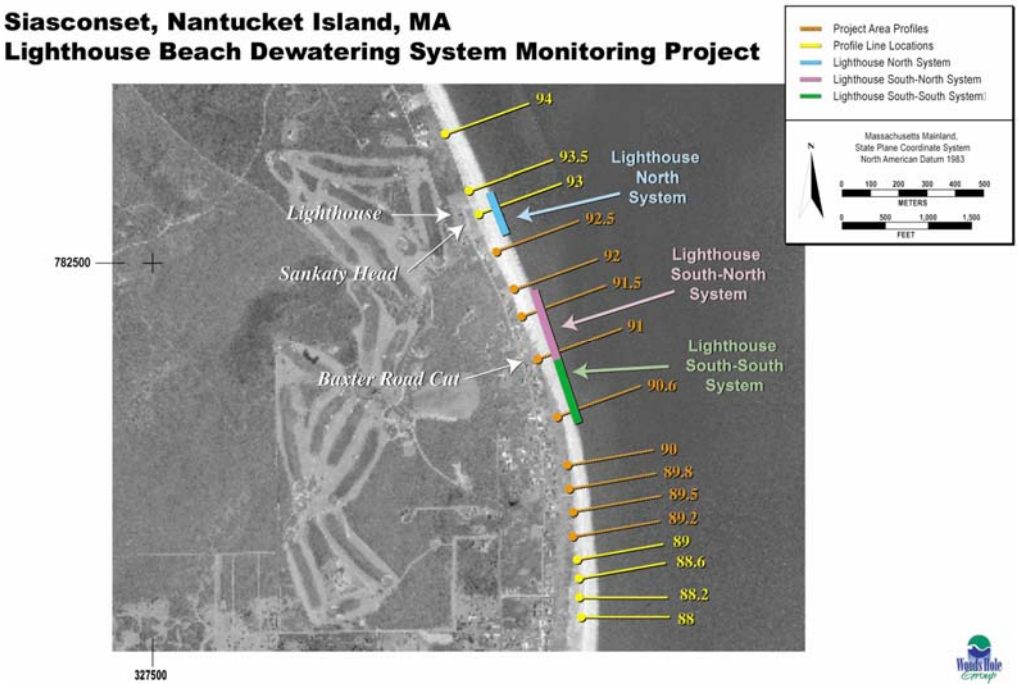
SOUTHEAST NANTUCKET BEACH MONITORING

March 2013

60th SURVEY REPORT



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August 2013

Southeast Nantucket Beach Monitoring

March 2013

60th SURVEY REPORT

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

Woods Hole Group, Inc. was contracted by the Siasconset Beach Preservation Fund (SBPF) to collect and analyze beach profile data related to the ongoing shoreline monitoring efforts. This report summarizes the March 2013 topographic survey data, which is the 60th survey conducted at Siasconset since 1994. WHG prepared similar data reports beginning with the 23rd survey. Previously, Coastal Planning & Engineering, Inc. (CP&E) completed more than five-years of monitoring at Siasconset, Nantucket Island, including 22 reports, after the installation of the initial dewatering systems. Coastal Stabilization, Inc. (original license holder in US) installed the original systems in August 1994 in an effort to mitigate beach erosion. One of these systems (Lighthouse South-South) was upgraded during 2001, subject to new permit conditions, as summarized in the SOC (SE 48-1248), U.S. Army Corps of Engineers (USACE) permit, local OOC, Waterways license, and CZM Consistency Statement. SOC SE 48-1248 required quarterly surveys with comparisons against the December 2001 baseline survey. The dewatering systems were shut down in December 2004, and the 3 years of post-upgrade surveys required by the SOC SE 48-1248 were completed. Subsequently, the systems have since been removed. Since this time, the focus of the surveys and reports is not on the performance of the dewatering system. Instead, surveys are intended to document beach profile and shoreline change in the region, and to help plan for and monitor ongoing and future shore protection initiatives.

This report provides comparisons of the recent March 2013 survey to previous data sets back to 1994. This report summarizes the results of volume and shoreline change calculations for three time periods:

- November 1994 survey through December 2001 (pre-operational period prior to the system upgrade);
- December 2001 through September 2012 (post-upgrade); and
- September 2012 through March 2013 (the last survey period).

The survey reports present new beach profile data and compare new beach profiles to previous data. Volume calculations and shoreline change analysis are provided to reveal erosion and accretion trends along the beach. This report does not discuss dewatering system performance or mitigation issues, which are not relevant at this time.

This report is presented in three sections plus one appendix.

- Specific information regarding the March 2013 topographic survey and beach profiles is presented in Section 2.0;
- Section 3.0 presents results of the volume and shoreline change calculations;
- Profile data are plotted in Appendix A.

2.0 MARCH 2013 SURVEY AND PROFILES

2.1 LAND-BASED SURVEY

Woods Hole Group conducted the 60th beach survey to a depth of -5 MLW from March 27-28th, 2013. Profile locations are shown in Figure 1. The horizontal datum for the project is the Massachusetts State Plane Coordinate System, Island Zone (1927), and the vertical datum is MLW, set in 1934 and corrected with 1992 NOAA adjustments by Blackwell and Associates, Inc. (BAI). Profiles were constructed based on RTK GPS data collected along the subaerial beach profile and traditional electronic total station survey data collected in the surfzone. Three geodetic control points were utilized for this survey:

- U.S. Coast and Geodetic Survey disk set in a large boulder located near the intersection of Quidnet and Squam Roads and stamped with the date 1934 and locally known as "Sugarloaf" (N 111,450.63, E 342,409.99, EL.=40.16 MLW92).
- Beach profile Station 84.6, a capped rebar set in a 4" PVC pipe located in the dune at the intersection of Beach Street and Codfish Park Road (N 96,006.53, E 347,614.23, EL.=12.31 MLW92).
- U.S. Coast Guard Disk #1, a brass disk stamped with the date 1961 located across the street from the entrance to the U.S.C.G. family housing near the Loran tower at Low Beach (N 92,601.73, E 344,906.23, EL=13.50 MLW92).

Woods Hole Group conducted the March 2013 survey using a Trimble® R7 GPS, a real-time kinematic global positioning system (RTK GPS). This GPS equipment provides centimeter-level geodetic positioning. The surveyor navigates to previously established (but unmarked) beach monitoring benchmarks, and collects topographic profile data without having to recover and reoccupy beach monuments at each profile. The system operates by establishing a GPS base station over a known geodetic control point. The base station communicates via a radio link with a second GPS receiver in a backpack worn while collecting the survey points on a hand-held data logger. The real-time horizontal positioning data is used to "steer to" the coordinates of the benchmark for each profile, and then walk perpendicular to the bank/bluff to collect the profile data. The RTK GPS equipment limits the surveyor's ability to wade to -5 MLW due to cabling, and is incapable of collecting wading shots due to excess movement. To remedy this, a Topcon GTS-3B electronic total station was utilized to collect the wading profile data.

Table 1 lists the profiles surveyed by BAI for the November 1994 and December 2001 surveys, and the profiles surveyed by Woods Hole Group for the March 2012 survey. All profiles reached -5 MLW. As explained in Section 3, ongoing erosion in the area afforded surveys of certain profiles extending landward of earlier 1994 and 2001 profiles, providing data for more informative volume calculations farther landward compared to most recent data sets. The "Distance" column in Table 1 represents the landward distance from the original benchmarks for which volume calculations were made between the two most recent surveys. Red numbers represent beach profiles for which volume change was calculated farther landward than in previous reports.

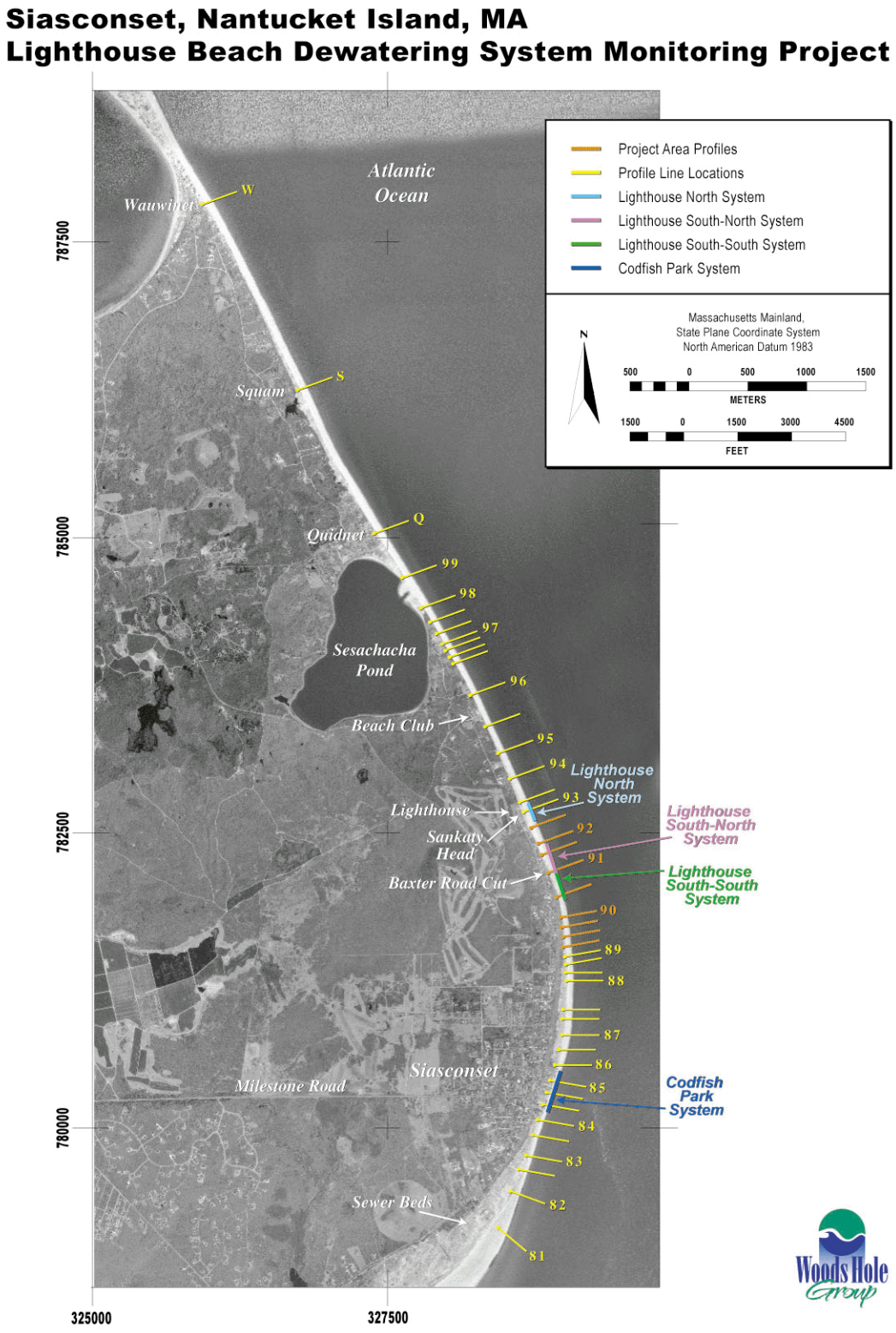


Figure 1. Project Location and Profile Map

Table 1. Profiles Surveyed (Project area shaded)

PROFILE NAME	Distance (ft)	SURVEY DATE			
		Nov-94	Dec-01	Sep-12	Mar-13
81	-200	✓	✓	✓	✓
82	-70	✓	✓	✓	✓
82.6	-50	N/A	✓	✓	✓
83	-20	✓	✓	✓	✓
83.5	-50	✓	✓	✓	✓
84	-20	✓	✓	✓	✓
84.3	0	✓	✓	✓	✓
84.6	0	✓	✓	✓	✓
85	0	✓	✓	✓	✓
86	-30	✓	✓	✓	✓
86.5	-223	✓	✓	✓	✓
87	-75	✓	✓	✓	✓
87.4	-146	N/A	✓	✓	✓
87.5	-155	✓	✓	✓	✓
88	-130	✓	✓	✓	✓
88.3	-110	✓	✓	✓	✓
88.6	-110	✓	✓	✓	✓
89	-167	✓	✓	✓	✓
89.2	-98	✓	✓	✓	✓
89.5	-89	✓	✓	✓	✓
89.8	-72	✓	✓	✓	✓
90	-102	✓	✓	✓	✓
90.6	-59	✓	✓	✓	✓
91	-111	✓	✓	✓	✓
91.5	-72	✓	✓	✓	✓
92	-68	✓	✓	✓	✓
92.5	-53	✓	✓	✓	✓
93	-26	✓	✓	✓	✓
93.5	-50	✓	✓	✓	✓
94	-52	✓	✓	✓	✓
95	-54	✓	✓	✓	✓
95.5	-56	✓	✓	✓	✓
96	-33	✓	✓	✓	✓
96.5	-19	✓	✓	✓	✓
96.7	-18	✓	✓	✓	✓
96.9	-5	✓	✓	✓	✓
97	-11	✓	✓	✓	✓
97.3	-15	✓	✓	✓	✓
97.6	-12	✓	✓	✓	✓
98	0	✓	✓	✓	✓
99	0	✓	✓	✓	✓
Q	-24	✓	✓	✓	✓
S	0	✓	✓	✓	✓
W	-30	✓	✓	✓	✓

N/A Not Available
RED NUMBER = profile using updated volume calculation windows

3.0 RESULTS

3.1 VOLUME CALCULATIONS

Volume calculations were performed using Matlab, and are presented in this report for these time periods:

- November 1994 to December 2001 (the dewatering system pre-operational period);
- December 2001 to September 2012 (the period from dewatering system activation through the last survey);
- September 2012 to March 2013 (the duration since last survey).

These surveys characterize volume change in the profile from the seaward position of the –5 ft isobath, landward to the toe of the dune (Xon). Volume calculations were computed from a landward limit ("baseline distance"), as specified in Table 1, to an offshore depth of –5 ft MLW. This baseline distance location was determined based on the toe of the bank locations for the December 2001 pre-operational survey (where applicable) or as far back as data were available for comparison with other surveys. Specific profiles were also translated horizontally to account for the movement of the benchmarks over time as the beach eroded in certain places (i.e., the 0 point in the field is the stake location, which had changed). Some of these translations are cumulative since December 2001, since five benchmarks were relocated between December 2002 and March 2003 (profiles 81, 87.5, 88.3, 91, and 93) as documented in the 32nd report. A different set of baseline distances was specified for comparisons with November 1994, since surveys at that time did not extend landward of the benchmarks (original baseline). For profiles 91 and 91.5, the baseline distance was modified from 0 ft to -20 ft because the ground survey in December 2001 did not extend landward beyond the toe of dune.

More recently, progressive erosion of the profiles since 2001 has resulted in a scenario where the active portion of certain profiles retreated landward of the baseline distance within which prior volume calculations are made. Figure 2 shows an example for profiles 90.6 and 91; the vertical dashed lines indicate the region within which volume calculations were made in this and prior reports. Prior to 2001, the "Old" area shown in Figure 2 represented the active profile; however, prevailing erosion produced a scenario where recent volume calculations limited to within the Old baseline distance do not represent overall profile change, since a significant portion of the active berm extends landward of the Old baseline. For instance, volume change for several profiles known to have eroded substantially would result in a positive volume change calculation indicating accretion if limited to the Old baseline distance. This trend exists for other profiles, but is not consistent across all profiles. Based upon discussions with SBPF, it was determined that volume calculation will now be extended landward as needed to more accurately represent beach volume change. The seaward limit of -5ft MLW isobath was maintained, while the landward limit of the profile was extended as far landward as practical to compare recent profiles ("New" distance shown by Figure 2). The adjusted profiles are highlighted red in column two of Table 1. The New results are not directly comparable

to calculations made for prior time periods in previous reports, but are more representative of recent dynamic beach response.

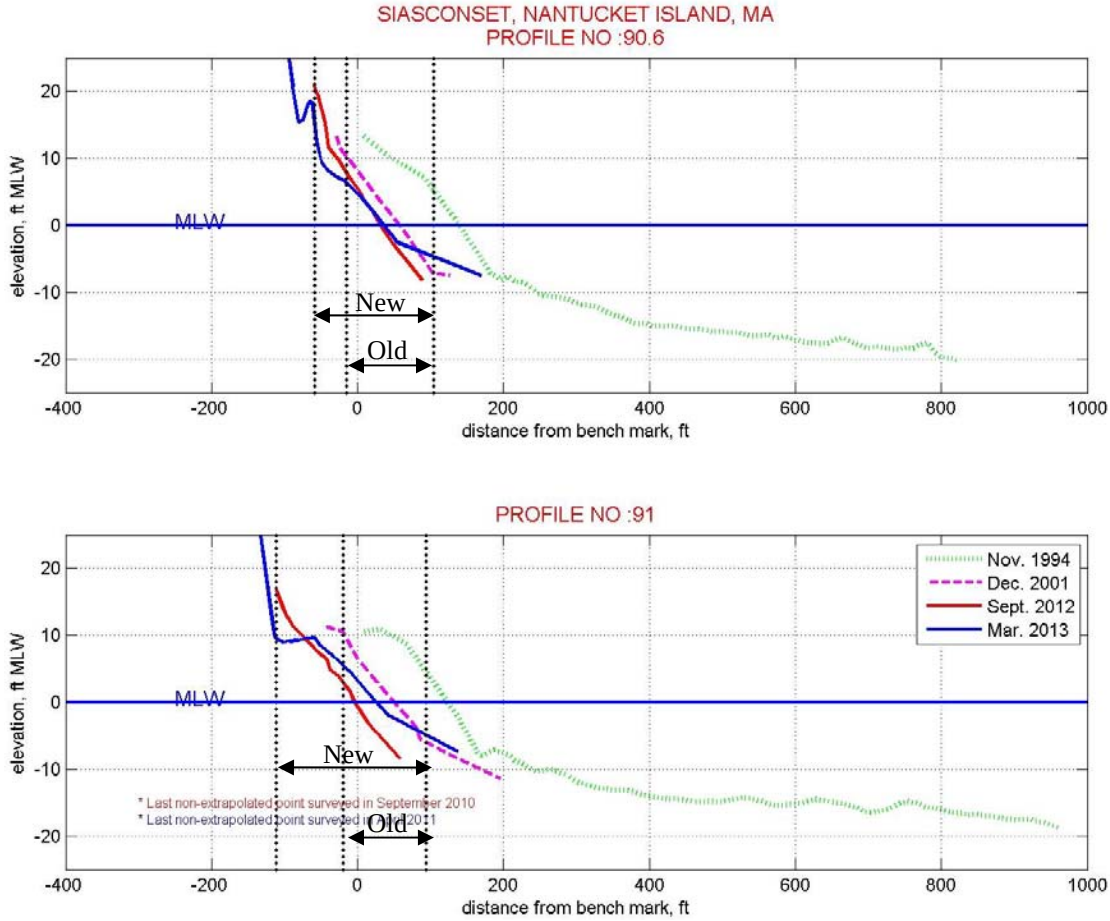


Figure 2. Profile for 90.6 and 91 indicating how the volume calculation region expanded for the March 2013 profiles.

Volume and shoreline change were calculated for the profiles in the entire monitoring area (profiles 81 to W), and the narrower project area as defined in the modified SOC. The project area is defined as the area extending from profile 89.2 through profile 92.5 (Figure 3). The mitigation areas, 1,000 ft to both sides of the previous Lighthouse South-South dewatering system site, are included in the definition of the project area. Profiles 90, 90.6 and 91 are used to calculate the treated area changes, profiles 89.2, 89.5, 89.8, 90 and 90.6 are used to calculate the south mitigation area changes, and profiles 90.6, 91, 91.5, 92, and 92.5 are used to calculate the north mitigation area changes. Although the dewatering system is no longer performing, these "project" and "mitigation" area definitions are maintained for consistency and comparison to past reports.

Table 2 lists the volume change for each profile station from November 1994 to March December 2001, December 2001 to September 2012, and September 2012 to March 2013. Results are summarized below.

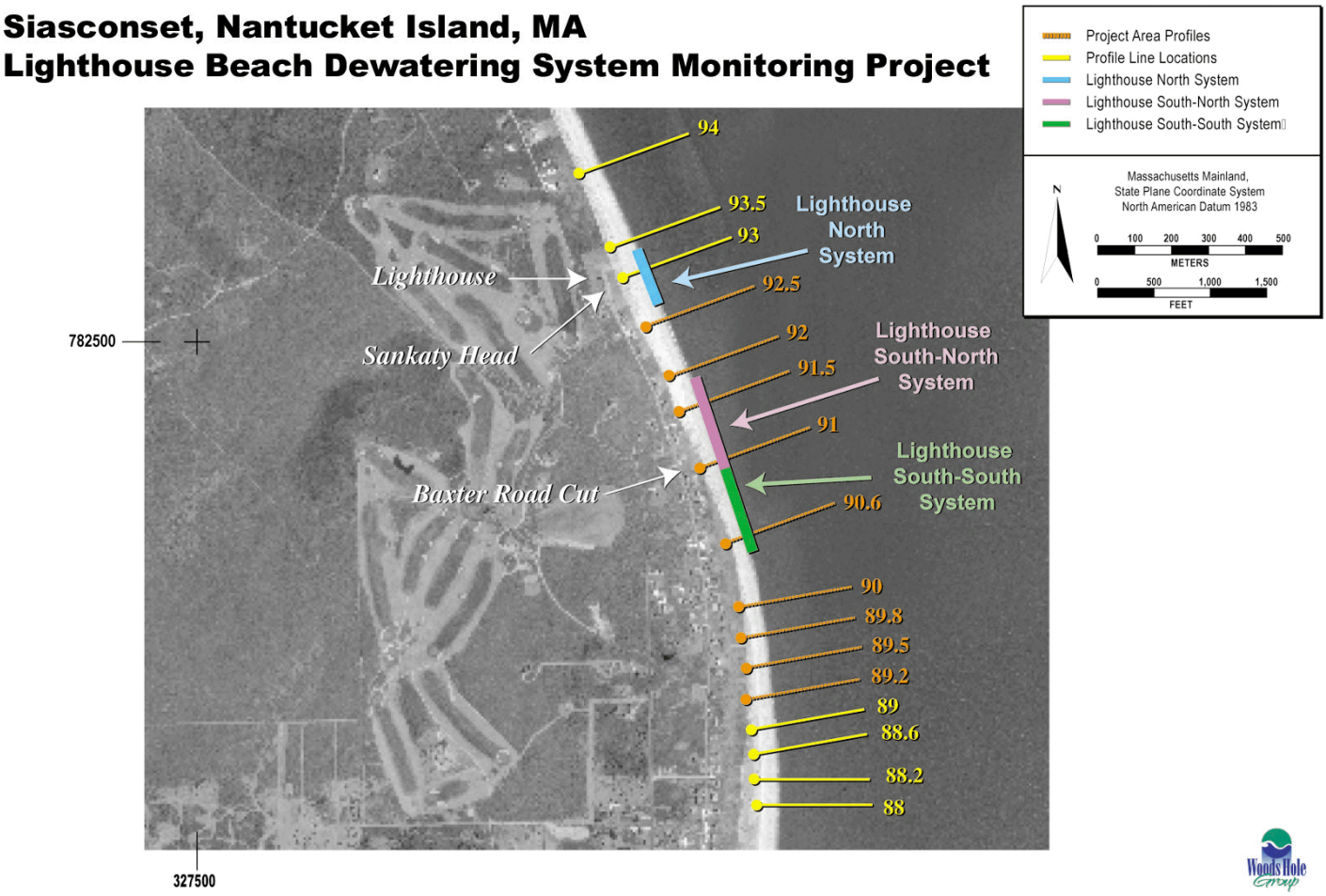


Figure 3. Previous Lighthouse dewatering system sites and project area

Table 2. **Volume change per profile from Nov. 1994 to Dec. 2001, Dec. 2001 to Sept. 2012, and Sept. 2012 to Mar. 2013 (+ Accretion, - Erosion)**

PROFILE	VOLUME CHANGE PER PROFILE		
	Nov-94 to Dec-01 cy/ft	Dec-01 to Sept-12 cy/ft	Sep-12 to Mar-13 cy/ft
81	-69	5.8	26.8
82	-31.7	12.9	6.2
82.6	N/A	13.3	3.9
83	47.7	22.4	-1.8
83.5	37.6	65.2	-16.5
84	11.8	75.1	-28.9
84.3	14.1	59.4	-31.9
84.6	36.4	0.6	-5.1
85	39.4	-8.1	-25.7
86	4	-16.9	-14.3
86.5	-27.1	-27.8	-20.0
87	-56	-14.5	-22.2
87.4	N/A	-13.4	-25.7
87.5	-50.4	-18.8	-32.5
88	-41.5	-33.9	-29.5
88.3	-48.5	-30.8	-23.9
88.6	-48.8	-24	-23.6
89	-55.5	-18	-19.1
89.2	-60.7	-11.2	-21.1
89.5	-65.2	-14.5	-12.8
89.8	-67.9	-11.3	-11.2
90	-61.5	-9.9	-8.8
90.6	-51.6	-11.9	-6.5
91	-42	-30.1	5.6
91.5	-21.1	-36.6	6.9
92	-12.5	-21.9	6.5
92.5	-21.1	-4.4	-4.7
93	-30.9	1.3	-6.5
93.5	-35.7	2.6	-8.7
94	-25.9	-10	-0.5
95	-25.3	-11.2	-8.2
95.5	-33.2	-23.1	-4.2
96	-6.2	-13.9	-5.4
96.5	-1.9	2.8	-9.7
96.7	-2	3.8	-3.0
96.9	-2.1	14.8	-11.6
97	-7.2	20.9	-5.9
97.3	-3.1	15	-6.0
97.6	3.4	8.5	-2.8
98	-0.3	13.3	-6.6
99	-1.9	25.8	-7.7
Q	6.7	-0.3	-2.4
S	21.4	19.6	-7.9
W	16.5	16.9	1.7

(Project area shaded) (N/A: Not Available)
RED NUMBER = profile using updated volume calculation windows

3.1.1 November 1994 to December 2001

This dewatering system preoperational period extends from the November 1994 (the earliest pre-construction survey) to the December 2001 survey (Table 3).

- Overall, 31 of the 42 profiles eroded since November 1994 (Note profiles 82.6 and 87.4 did not exist in November 1994).
- The central portion of the monitoring area eroded (profile lines from 86.5 through 95.5), from just north of Codfish Park to Sesachacha Pond). Maximum erosion was focused between profiles 87 and 91, where total erosion since 1994 exceeds 40 cy/ft; with a maximum of 68 cy/ft of erosion at profile 89.8.
- The southernmost profiles, characterized by profiles 83 through 86, accreted with the exception of profiles 81 and 82. Maximum accretion was more than 47 cy/ft at profile 83.
- The beach has been relatively stable and even accreting over the long-term from profiles 96 through W.
- In the project area, all profiles from 89.2 to 92.5 eroded between 12 and 67 cy/ft in over 7 years since November 1994.

3.1.2 December 2001 to September 2012

This period extends from the activation of the dewatering system through the last survey in September 2012. Table 3 presents volume change for the monitoring area.

The monitoring area performed as follows:

- Overall 24 transects eroded during the reporting period.
- The southern portion of the monitoring area, profile 81 through profile 84.6, gained sediment over the past 11 years.
- Maximum accretion occurred at profile 84, where more than 75 cy/ft of sediment accumulated in the past 11 years.
- The central portion of the study area, between profiles 85 through 92.5 eroded
- Maximum erosion of more than 36 cy/ft occurred at profile 91.5.
- In the northern reach beach volume changes from profile 96.5 to W were generally positive (0 to 25 cy/ft of accretion).
- In the project area, all profiles from 89.2 to 92.5 eroded between 4 and 36 cy/ft in 11 years since December 2001.

3.1.3 September 2012 to March 2013

This period spans the duration since the last survey in September 2012. Table 3 presents the results. The volume change calculation was adjusted for a number of profiles (highlighted in red in Table 3) as discussed in Section 3.1.

The monitoring area performed as follows:

- Of the 44 profiles surveyed in the monitoring area, 37 profiles eroded, and 7 profiles accreted since September 2012; erosion was the dominate trend for most profiles since the last survey.
- Maximum erosion occurred at profile 87.5, which eroded more than -31 cy/ft and maximum accretion occurred at profile 81, which gained 26 cy/ft.
- Erosion was concentrated between profiles 83.5 and 89.8, where erosion ranged from 5 cy/ft and up to 31 cy/ft.
- In the project area, three profiles accreted and six profiles eroded with a maximum erosion of -21 cy/ft.

3.2 SHORELINE CHANGE ANALYSIS

Woods Hole Group evaluated shoreline change (retreat or advance of the mean low water line) to provide qualitative insight regarding beach response in the project vicinity. This section provides a comparison of shoreline changes since November 1994 for the monitoring area for the three periods under investigation.

Shoreline distances were measured from the baseline horizontally to the 0 ft MLW92 contour level. This elevation was selected for comparison with prior reports. These surveys included comparisons between the earliest survey of November 1994, the pre-operation survey of December 2001, the last survey in September 2012, and the latest March 2013 survey. Table 3 lists shoreline change by profile for the surveys under investigation. Figure 4 illustrates the change in the shoreline positions.

Results can be summarized as follows:

3.2.1 November 1994 to March 2013

- In general, the shoreline advanced in the southern portion of the monitoring area (profiles 82 to 85), retreated substantially in the middle (profiles 86 to 96.7), and was relatively stable or accreting at the northern portion (profiles 96.9 to W).
- Maximum shoreline advance occurred between profiles 83 and 84.6, where the shoreline advanced more than 65 ft, and as much as 150 ft at profile 83.5.
- Maximum shoreline retreat occurred between profiles 86.5 and 91, where the shoreline retreated more than 87 ft and as much as 134 ft at profile 88.3.

3.2.2 December 2001 to March 2013

- Although there has been more variability, the shoreline change trend since December 2001 is similar to the trend since 1994. The southern and northern limits accreted while the middle of the monitoring area eroded.
- An exception to the trend is at the very southern end (profiles 81 and 82) where the overall trend of erosion since 1994 has been accreting since 2001.
- Shoreline advance since December 2001 occurred between profiles 81 and 84.6, with a maximum shoreline advanced of 113 ft at profile 81.

- Shoreline retreat since December 2001 occurred between profiles 85 and 96.5, with a maximum shoreline loss of 63 ft along profile 88.

3.2.3 September 2012 to March 2013

- The shoreline advanced (29 of 44 profiles) between profiles 81 and 83.5 and 89.5 and W since the last survey.
- Maximum shoreline advance in the past seven months occurred at profile 81, accreting 114 ft.
- Erosion was focused between profiles 84 and 89.2 with maximum retreat of 24 ft and 25 ft at profiles 87.5 and 84.3.
  In the project area the shoreline along all profiles, except 89.2, advanced likely due to a portion of sediment eroded from the bluffs remaining on the beach.

Table 3. Shoreline changes from Nov. 1994, Dec. 2001, and Sept 2012 to March 2013 (Distances seaward from benchmark to 0 ft MLW92 contour)

PROFILE	SHORELINE CHANGE PER PROFILE Nov-94 to Mar-13 ft	SHORELINE CHANGE PER PROFILE Dec-01 to Mar-13 ft	SHORELINE CHANGE PER PROFILE Sept-12 to Mar-13 ft
81	-15.7	113.0	114.1
82	8.9	52.7	46.9
82.6	N/A	42.9	37.8
83	129.0	43.9	22.7
83.5	150.2	84.7	0.2
84	119.5	100.5	-19.4
84.3	88.4	64.6	-25.6
84.6	65.8	13.6	17.3
85	32.0	-30.3	-14.8
86	-33.3	-38.6	-4.1
86.5	-87.2	-40.8	-1.1
87	-120.8	-26.5	-0.8
87.4	N/A	-32.7	-16.1
87.5	-133.3	-53.3	-24.3
88	-131.0	-63.0	-13.1
88.3	-134.8	-53.7	-9.1
88.6	-130.6	-44.4	-7.7
89	-129.7	-33.4	-1.9
89.2	-125.9	-27.6	-6.8
89.5	-115.0	-15.6	18.2
89.8	-117.6	-10.5	14.9
90	-121.9	-14.1	8.6
90.6	-103.5	-21.6	5.0
91	-96.5	-6.6	30.2
91.5	-58.9	8.4	37.9
92	-45.4	-27.1	26.2
92.5	-41.3	-0.7	11.8
93	-47.3	-2.8	2.5
93.5	-66.8	-2.0	1.4
94	-50.8	-10.2	13.4
95	-64.7	-22.7	3.2
95.5	-76.1	-40.6	3.1
96	-42.5	-10.5	15.0
96.5	-6.2	-1.1	0.9
96.7	-0.9	6.2	8.1
96.9	4.6	7.9	-3.5
97	13.2	22.9	-0.5
97.3	13.6	18.9	7.2
97.6	14.3	10.2	8.0
98	4.5	5.7	2.5
99	23.7	24.3	1.2
Q	3.7	4.3	11.8
S	33.2	12.9	1.3
W	25.8	22.3	12.0

(N/A : Not Available)

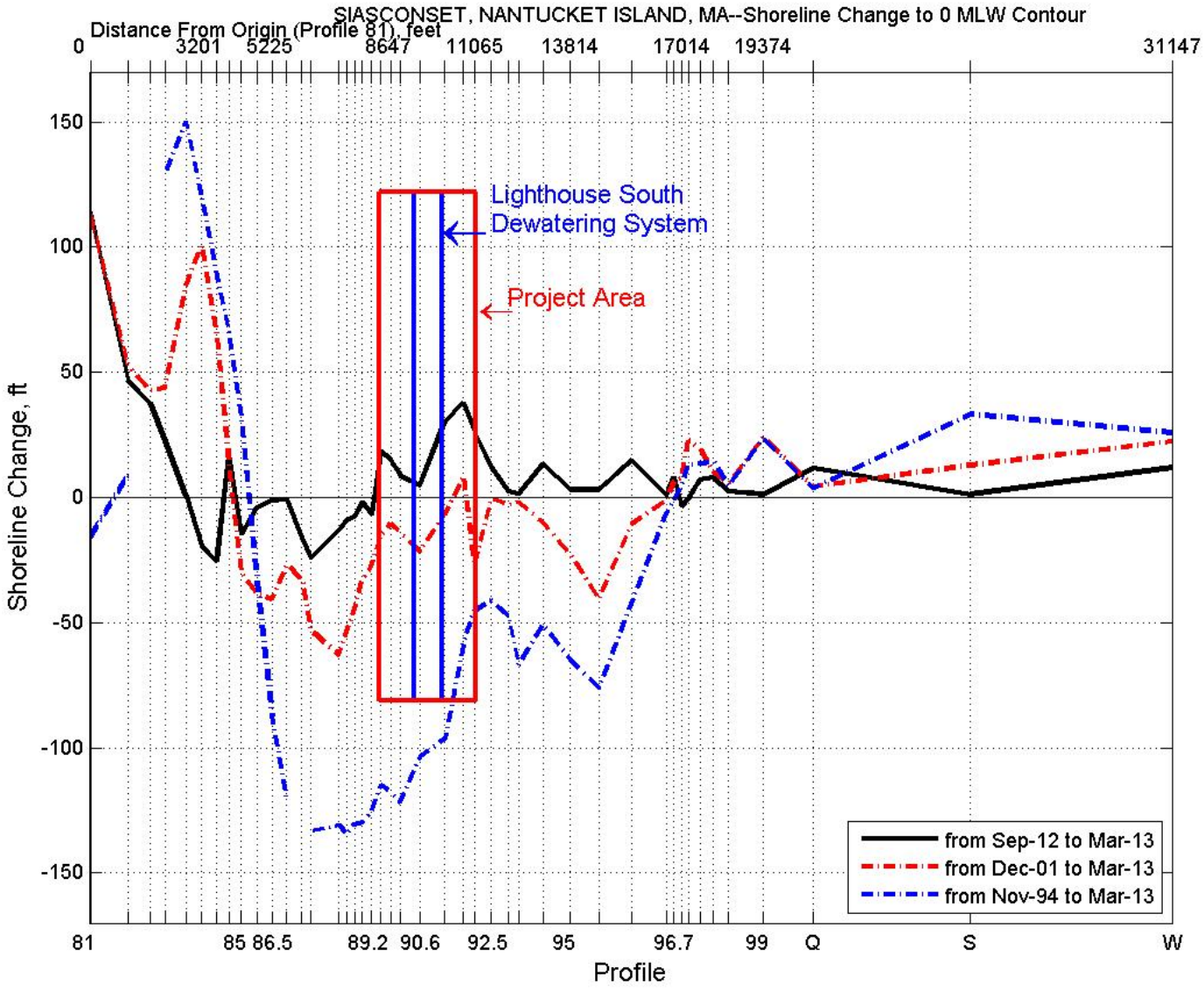


Figure 4. MLW shoreline change from November 1994, December 2001, and September 2012 to March 2013.

3.3 WAVE CONDITIONS

The 60th survey is defined by the time period of September 12, 2012 through March 30, 2013. Wave data for this time period was obtained from the Woods Hole Oceanographic Institution's Martha's Vineyard Coastal Observatory (MVCO), located approximately 1.5 kilometers south of Edgartown Great Pond in 12 meters of water. The MVCO collects wave data every 20 minutes and functioned with a 98% data return for the period. Although the MVCO data is not entirely representative of nearshore conditions at Siasconset (due to partial sheltering of the MVCO from waves arriving from the East to Northeast) the MVCO is the only source for measurements of the directional distribution of waves in the region. At the location of the MVCO, waves arrive primarily from West-Southwest to East-Southeast, with the majority arriving from the South. This is expected since the waves are becoming more shore-normal as they approach the southern-facing shoreline of Martha's Vineyard. Wave data were also obtained from the National Oceanic and Atmospheric Administration's National Data Buoy Center (NDBC) Station 44008. This station recorded data for a 20-minute sampling period every hour and was located 54 nautical miles southeast of Nantucket Island in 62.5 meters of water. NDBC Station 44008 achieved a data return of 99.5% for this sampling period; however, the station went adrift on 2/9/13 and data recorded after this date are not included in Figure 5, nor incorporated elsewhere in this report. Both data sets were processed to evaluate wave characteristics and storm events for the period of interest.

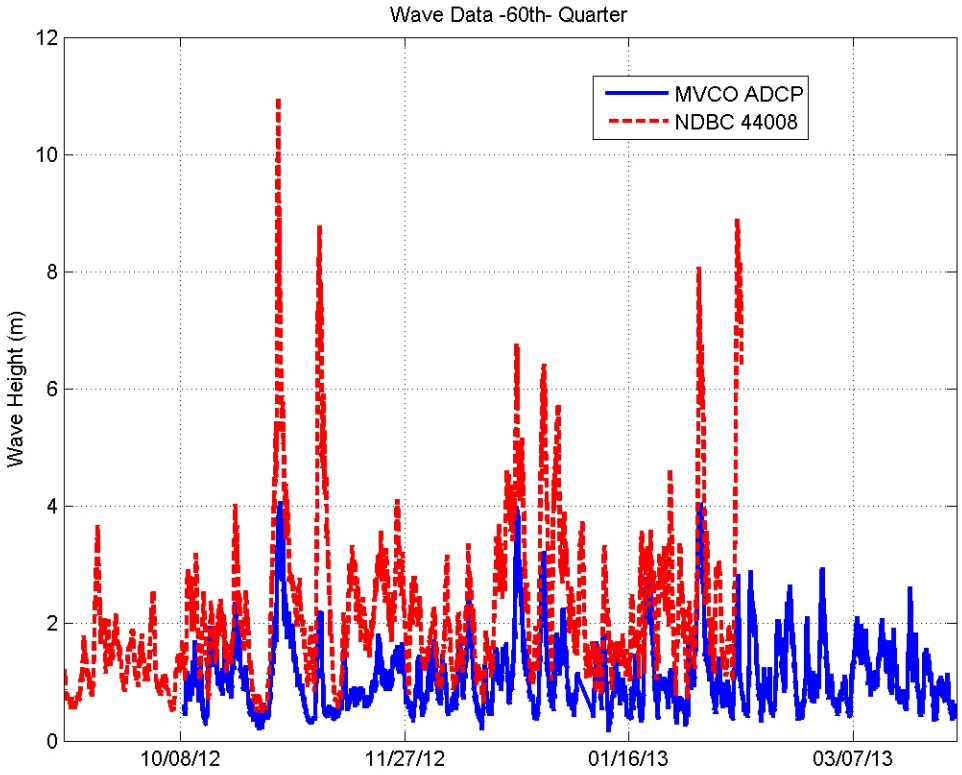


Figure 5. Time series of wave height for 60th survey period

Time series of wave height data for the period show a variety of storms during the 60th survey period. Both the NDBC Station 44008 and MVCO data are shown in Figure 5, indicating which storms observed in the offshore data had an impact on the islands of Nantucket and Martha's Vineyard. There were approximately thirty (30) events when wave heights exceeded 1 meter at the MVCO location for an extended duration. The most significant storm was Hurricane Sandy from October 22-31st that generated waves over 4 m at the MVCO station and 10 m at NDBC Station 44008. The overall energy-weighted average wave height for the time period was 1.3 meters at the MVCO location and 2.67 meters at the offshore NDBC buoy. These heights are indicative of energetic wave conditions for the winter season.

4.0 SUMMARY

From the analysis of the data collected for the 60th survey (March 2013), the following summary can be made

- Significant erosion of the beach, dunes, and bluff was visually observed during the March 2013 survey.

- An analysis of the wave data between the September 2012 and March 2013 indicate this time period was energetic with the overall energy-weighted average wave heights of 1.3 meters at the MVCO location and 2.67 at Station 44008.

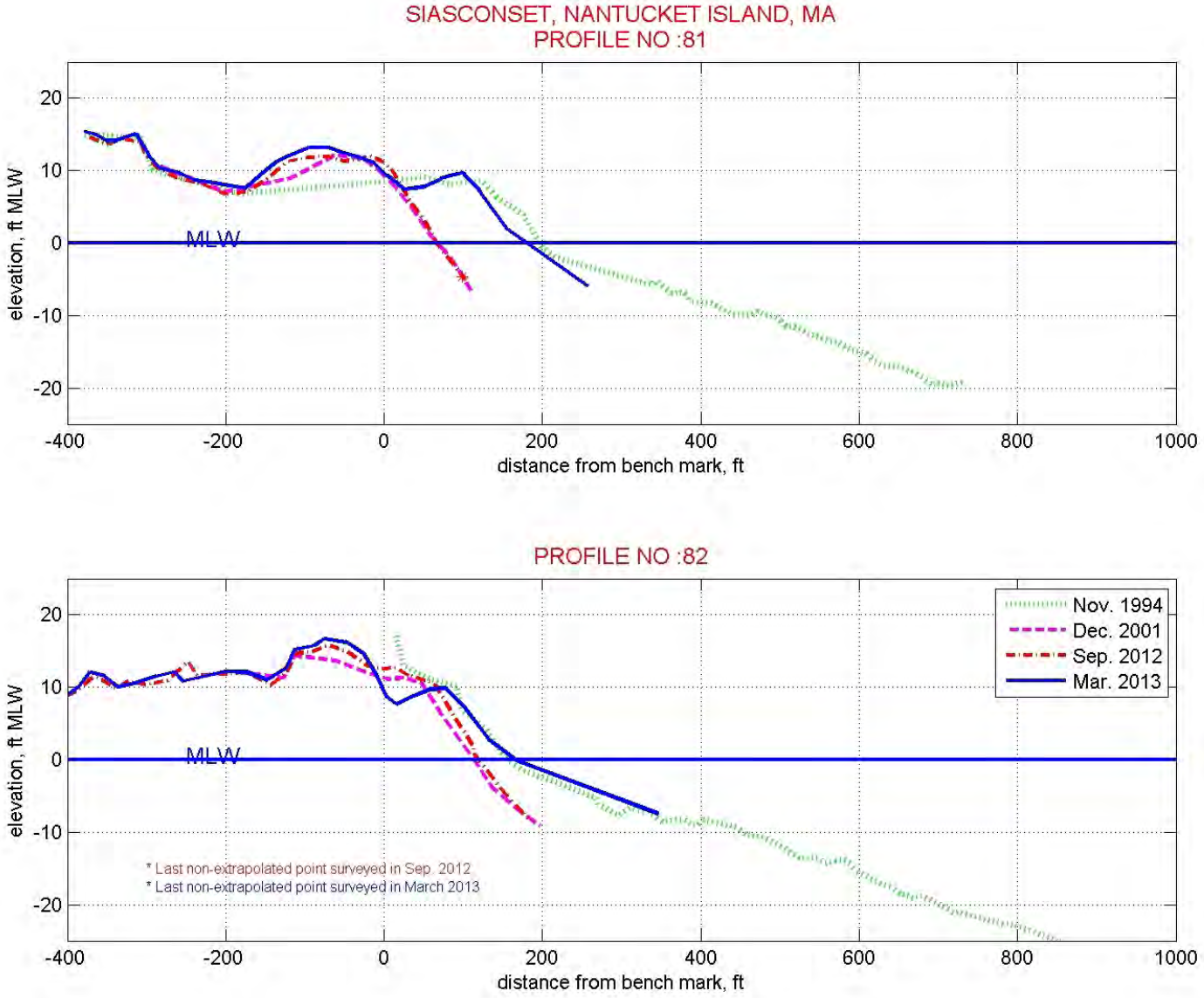
- Beach volume change calculations were made between November 1994 and December 2001, December 2001 and September 2012, and September 2012 to March 2013. This is a departure from previous volume change calculations that were made comparing the historical results to the most recent survey. In addition, the region for the volume calculations for the September 2012 to March 2013 was adjusted for a number of profiles. As a result, these volume calculations are not directly comparable to previous reports.

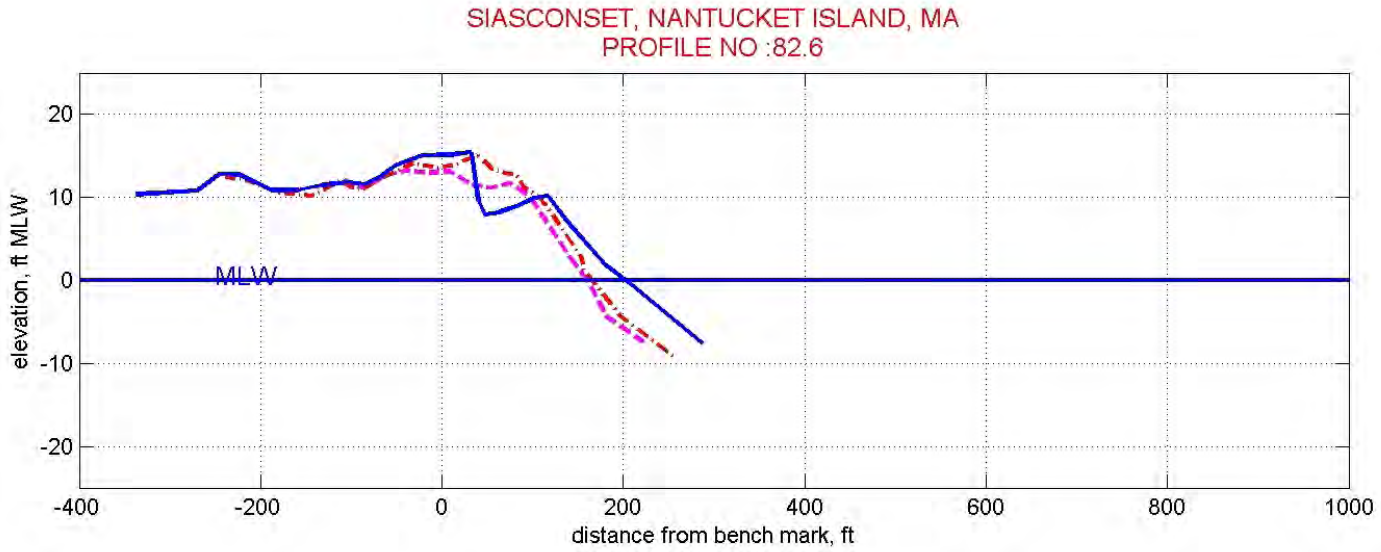
- Between these three monitoring periods, the general trend for volume and shoreline change demonstrated the northern and southern portions of the monitoring area accreted, while the middle portions of the monitoring area eroded.

- The most recent survey shows erosion of more than 10 cy/ft between profiles 83.5 and 88.6 since September 2013 with a maximum of 32 cy/ft at profile 89.8.

- Since September 2012, only six of the nine profiles lost beach volume, and eight profiles exhibited shoreline advance up to 37 ft. This may seem counterintuitive based on the long-term erosional trends for the project area, and given the significant amount of regional erosion observed this winter. However, it appears that a significant portion of sand eroded from the bluffs was deposited in the surf zone between MLW and the -5 ft MLW contour. The profile comparison figures in Appendix A illustrate this trend, and show the amount of material deposited below MLW resulted in shoreline advance, and even an overall gain in beach volume since September 2012 for certain profiles.

APPENDIX A


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :81
elevation, ft MLW
MLW
distance from bench mark, ft
PROFILE NO :82
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :82.6
elevation, ft MLW
MLW
distance from bench mark, ft
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-200
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400
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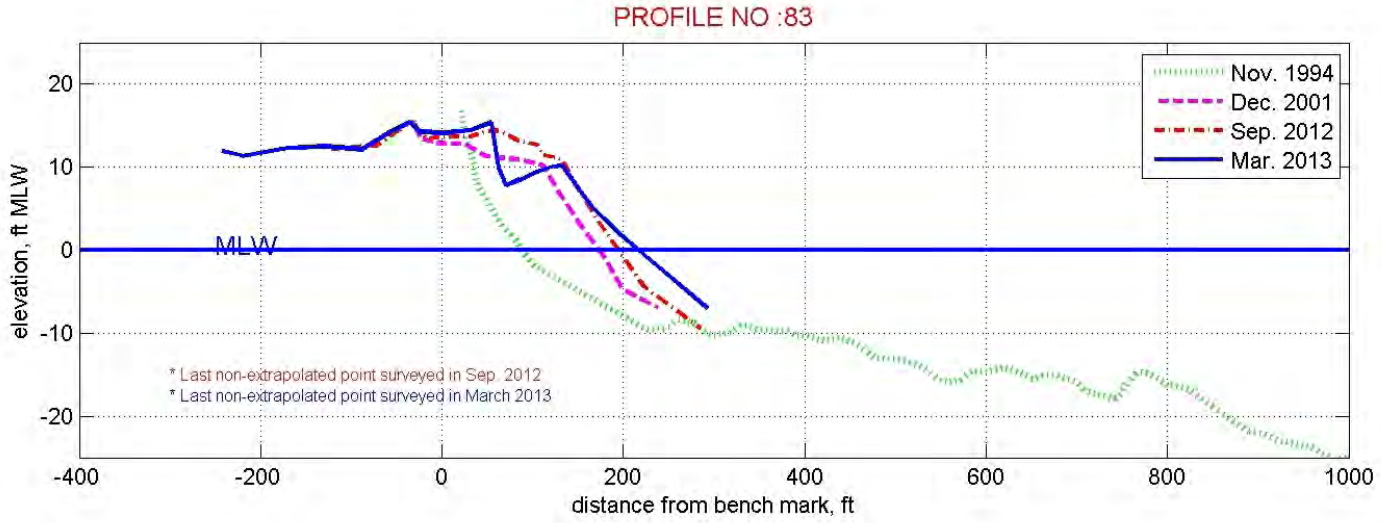
800
1000


PROFILE NO :83
elevation, ft MLW
MLW
distance from bench mark, ft
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013
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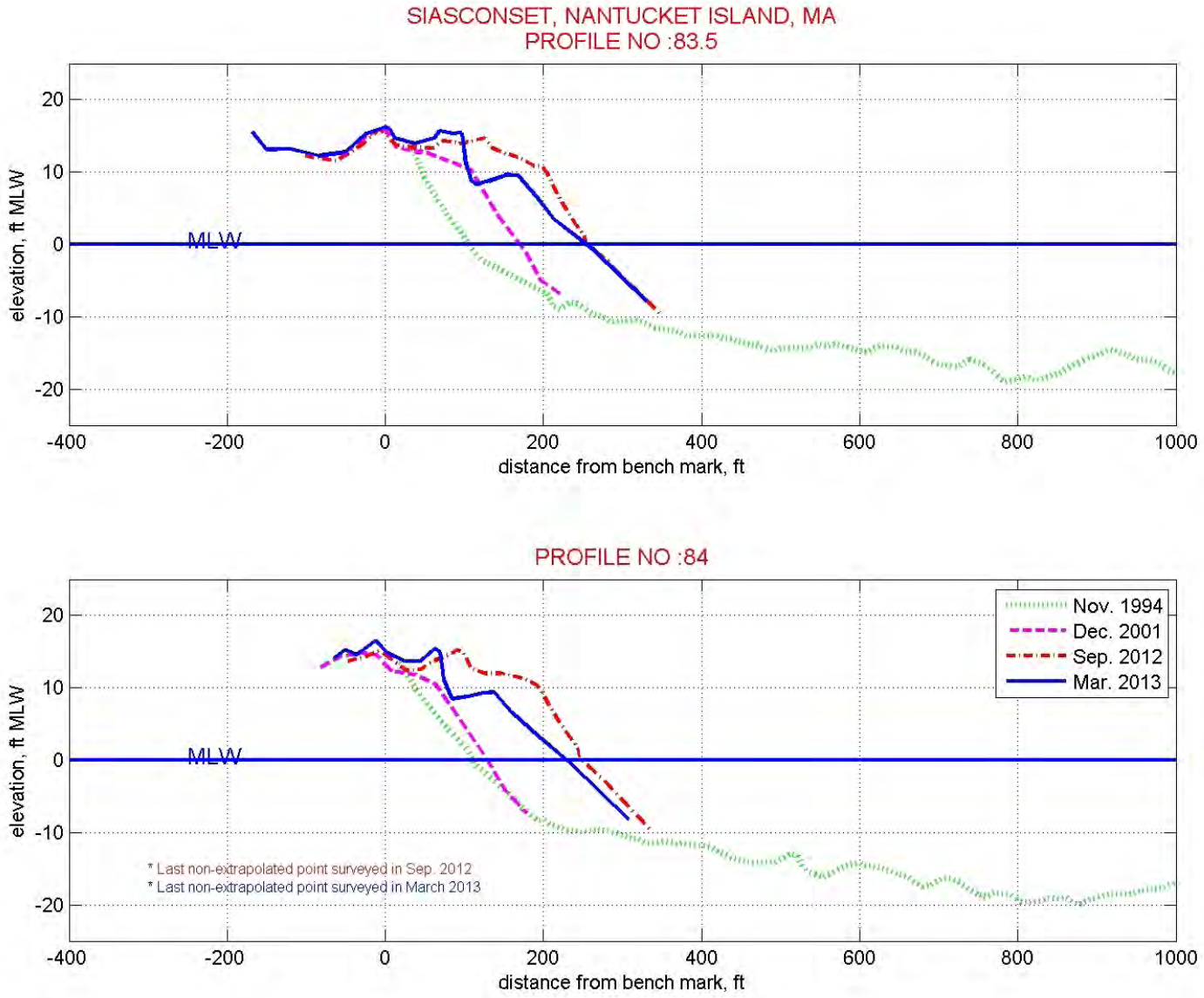
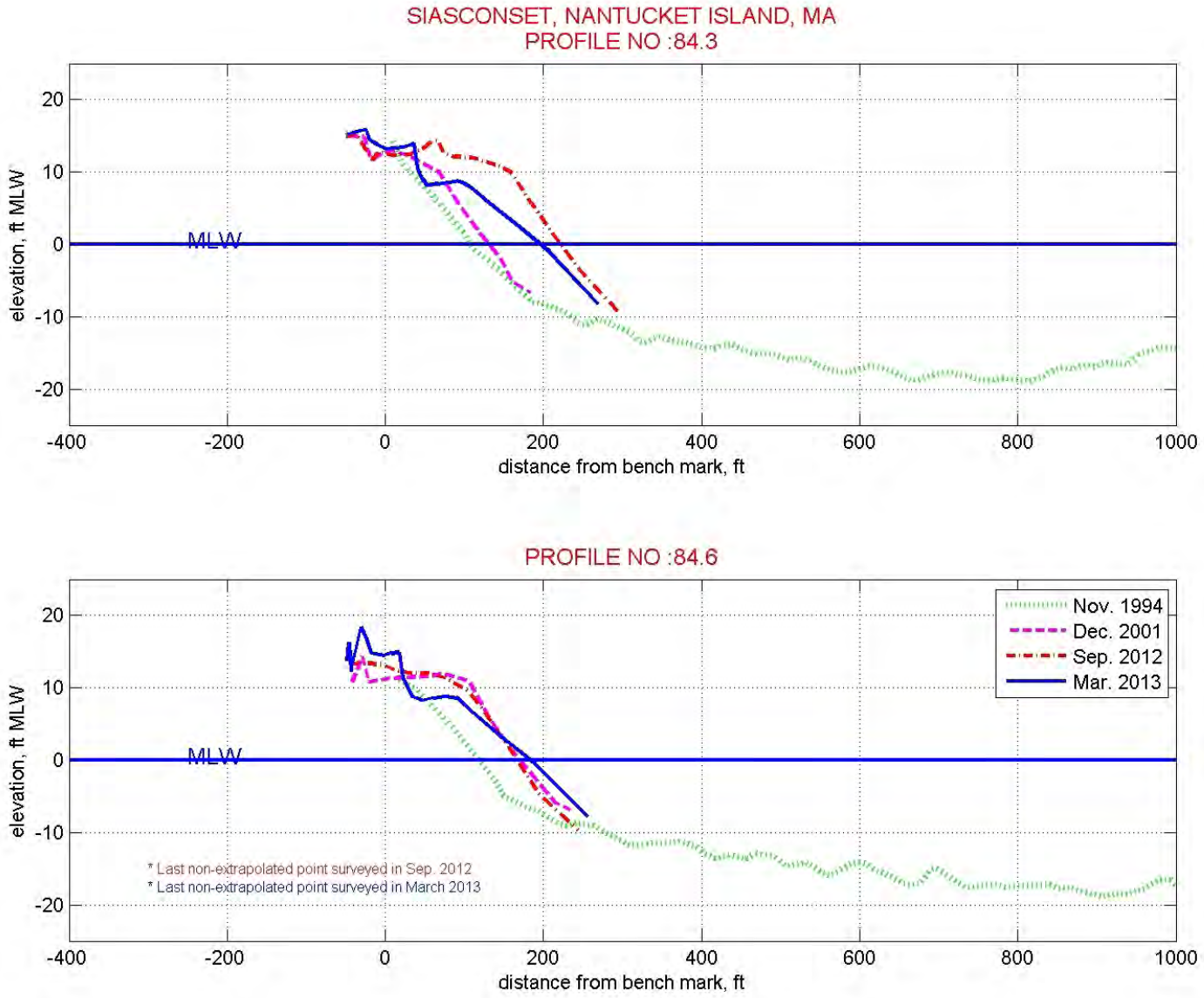
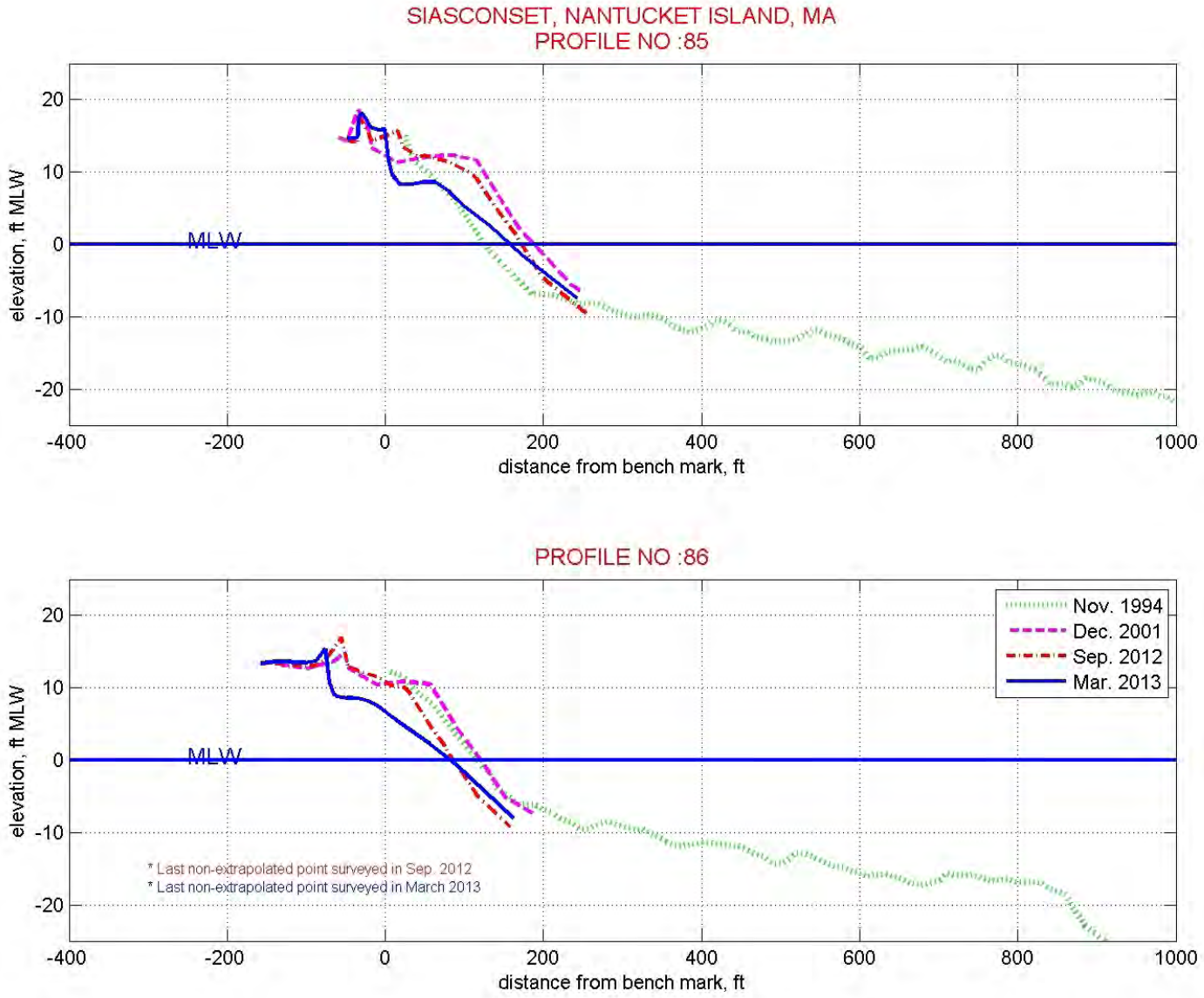
10
0
-10
-20
-400
-200
0
200
400
600
800
1000


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :83.5
elevation, ft MLW
MLW
distance from bench mark, ft
PROFILE NO :84
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :84.3
elevation, ft MLW
MLW
distance from bench mark, ft
PROFILE NO :84.6
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :85
elevation, ft MLW
MLW
distance from bench mark, ft
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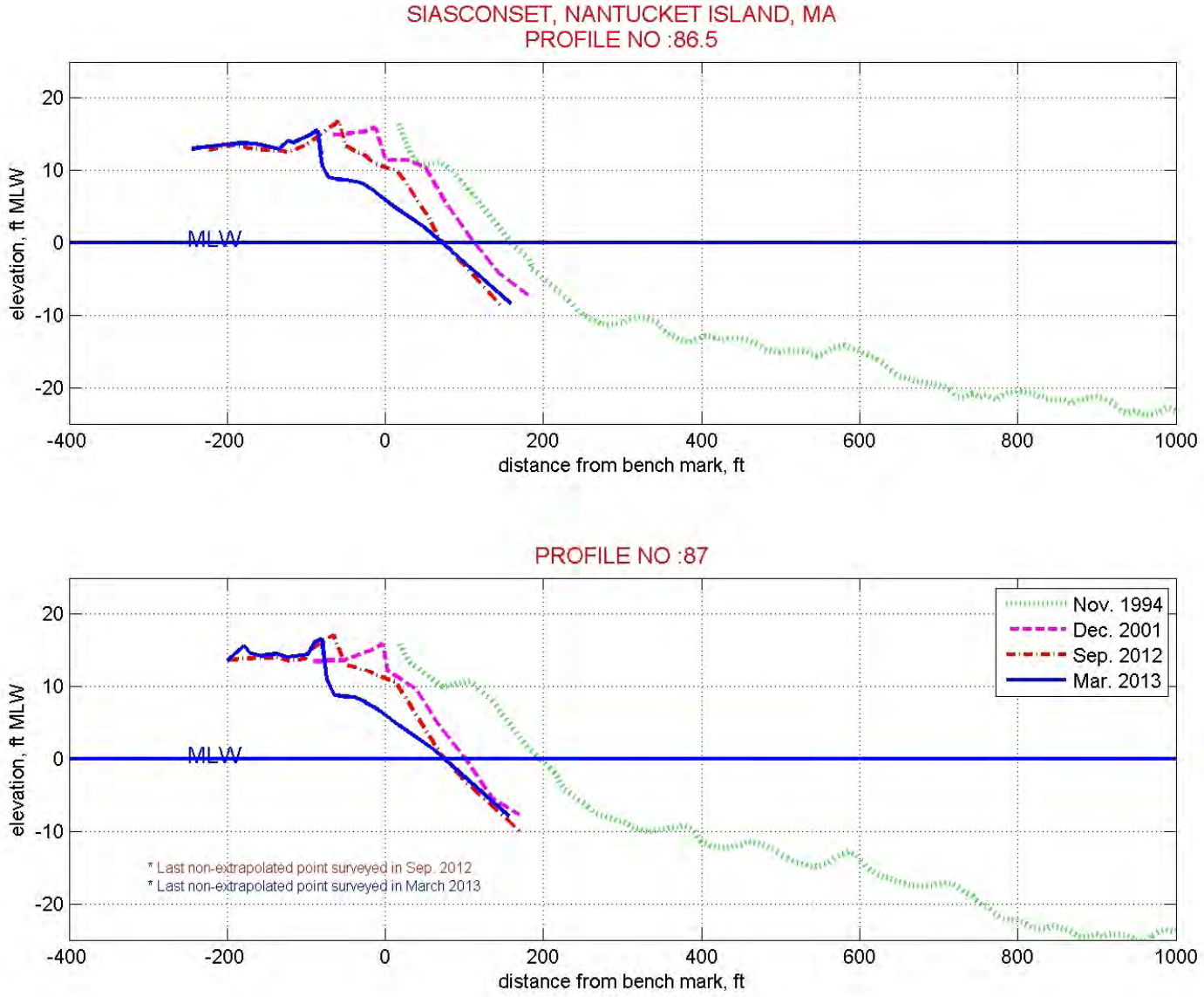
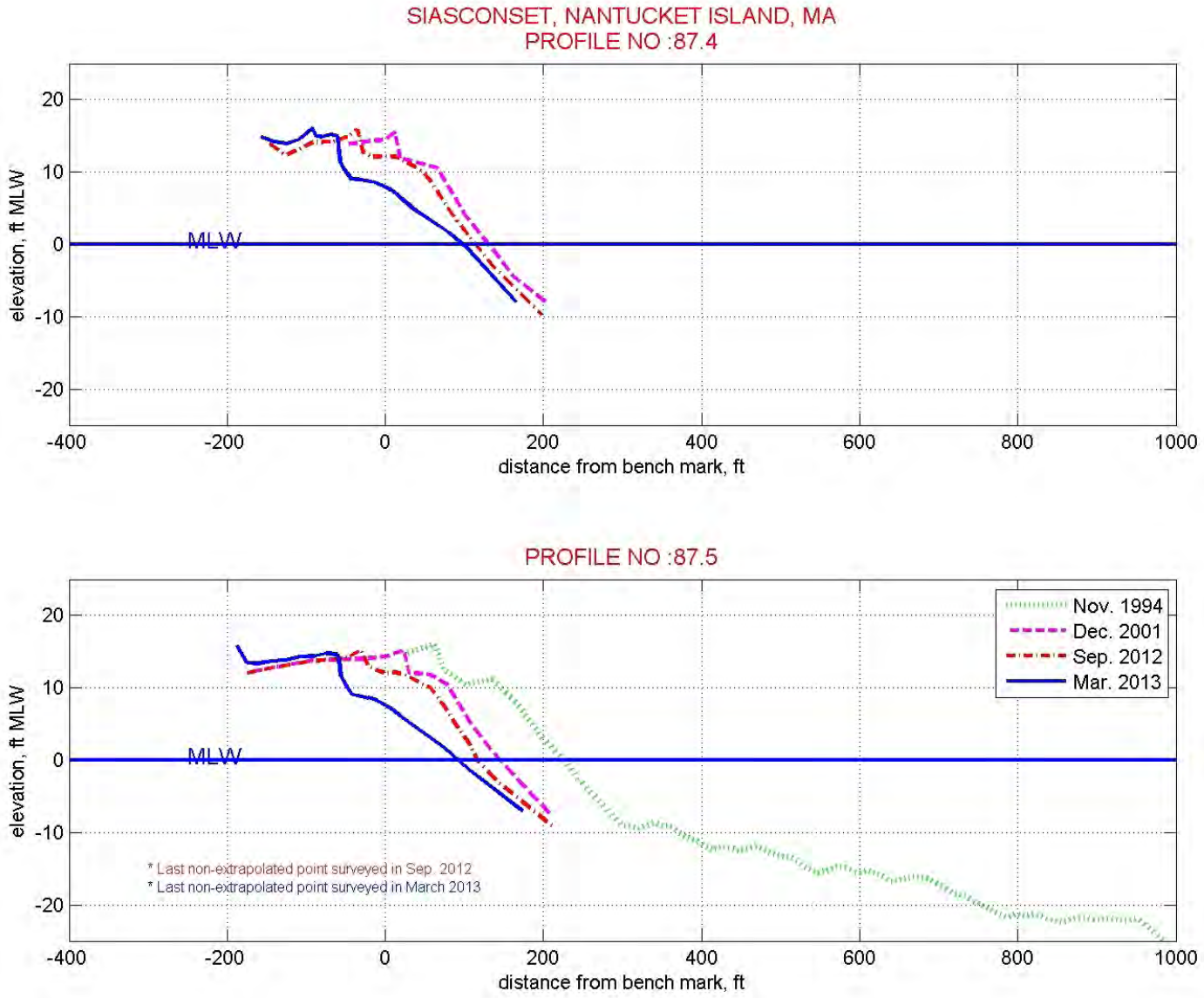
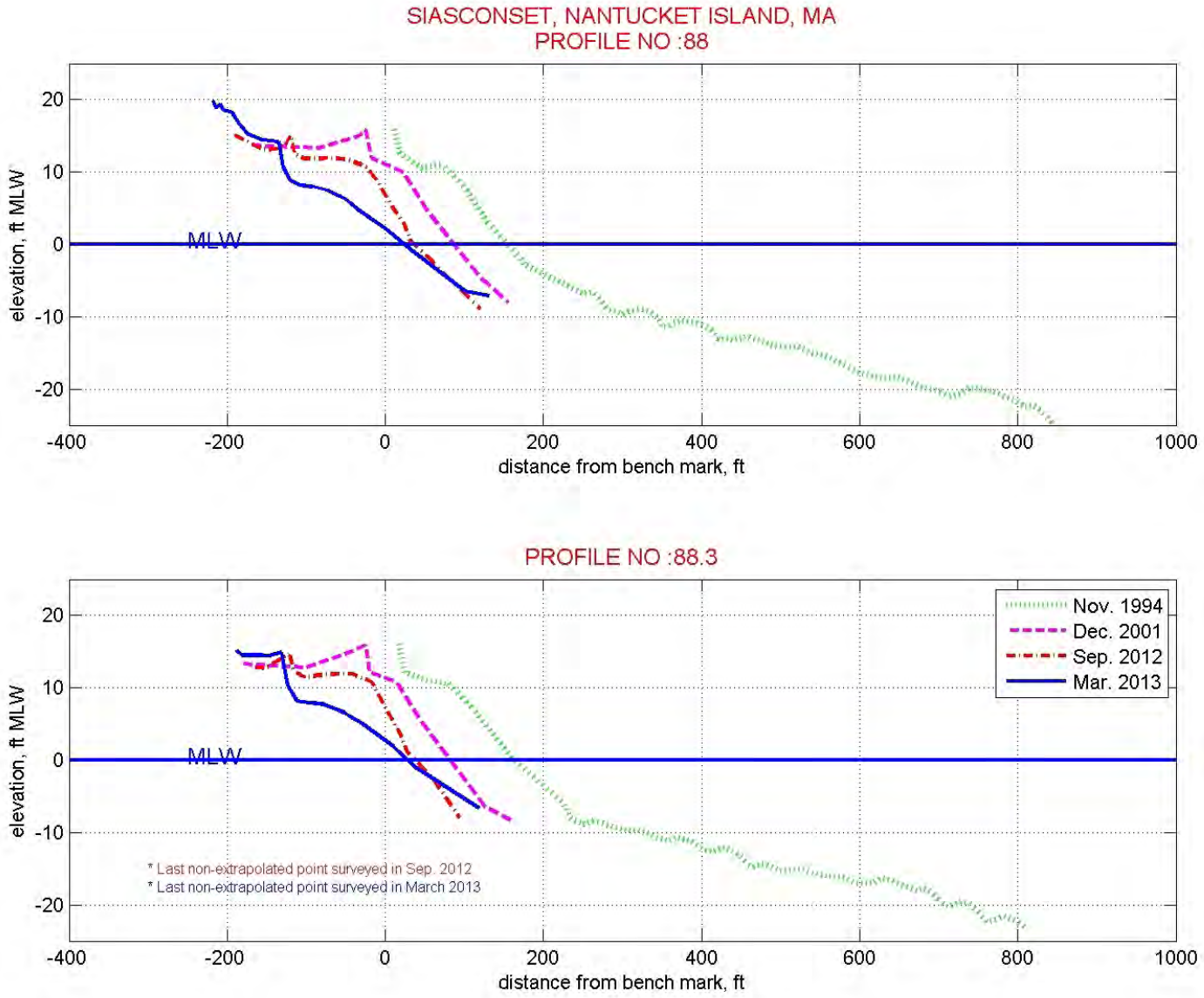
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :86.5
elevation, ft MLW
MLW
distance from bench mark, ft
PROFILE NO :87
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :87.4
elevation, ft MLW
distance from bench mark, ft
MLW
20
10
0
-10
-20
-400
-200
0
200
400
600
800
1000
PROFILE NO :87.5
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013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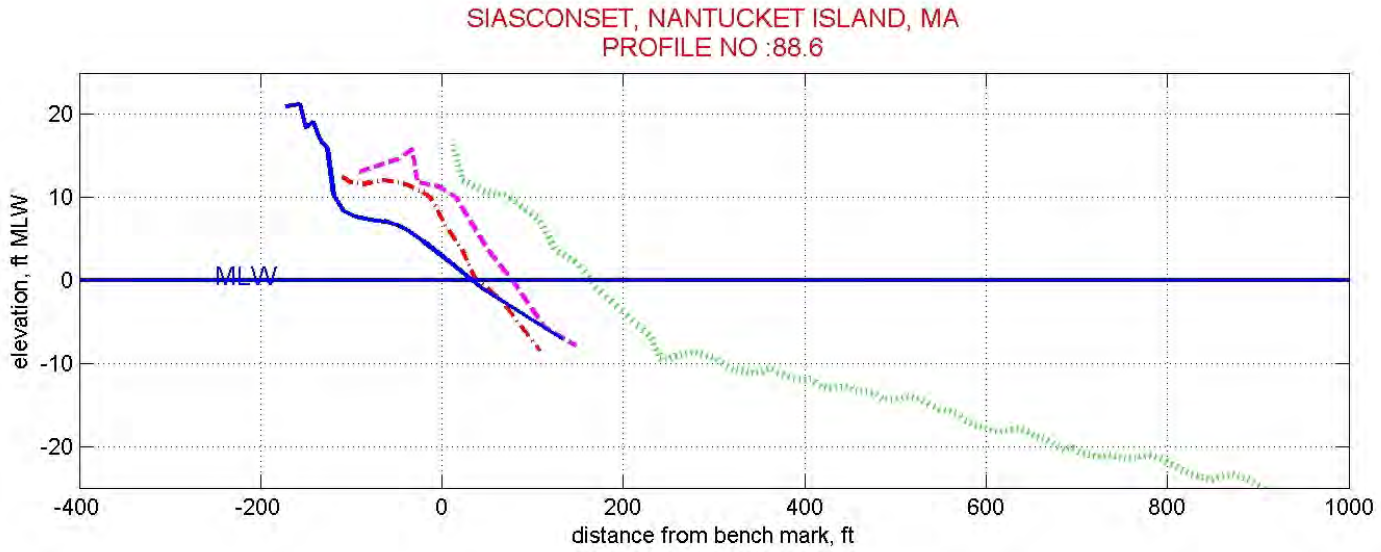
PROFILE NO :88
elevation, ft MLW
MLW
distance from bench mark, ft
PROFILE NO :88.3
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :88.6
elevation, ft MLW
MLW
distance from bench mark, ft
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0
-10
-20
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-200
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400
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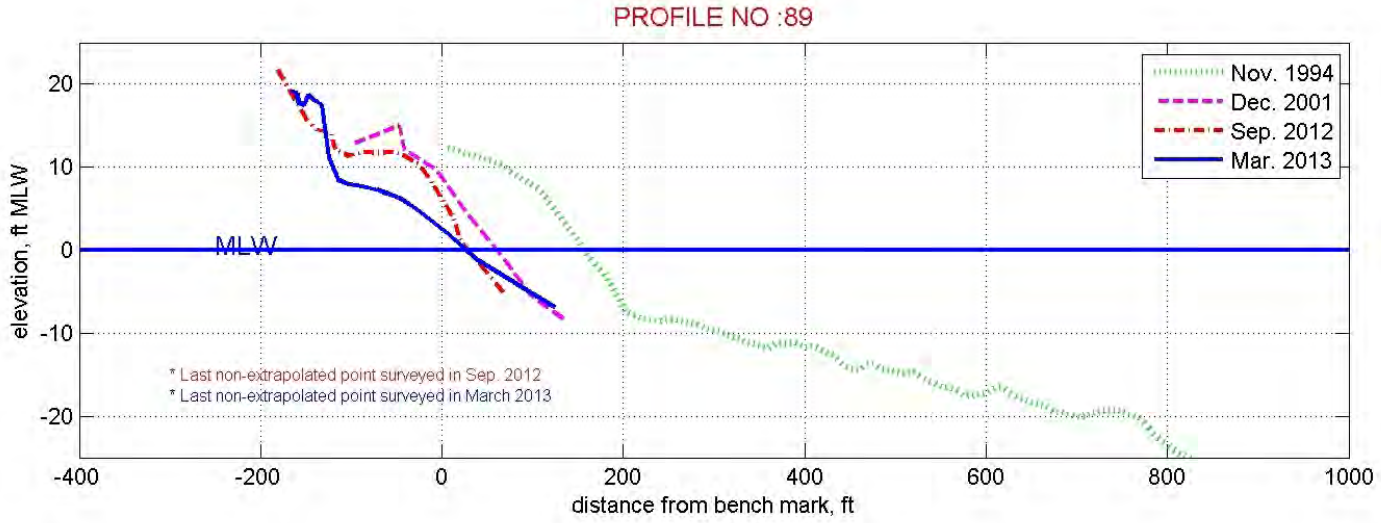
800
1000


PROFILE NO :89
elevation, ft MLW
MLW
distance from bench mark, ft
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013
20
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0
-10
-20
-400
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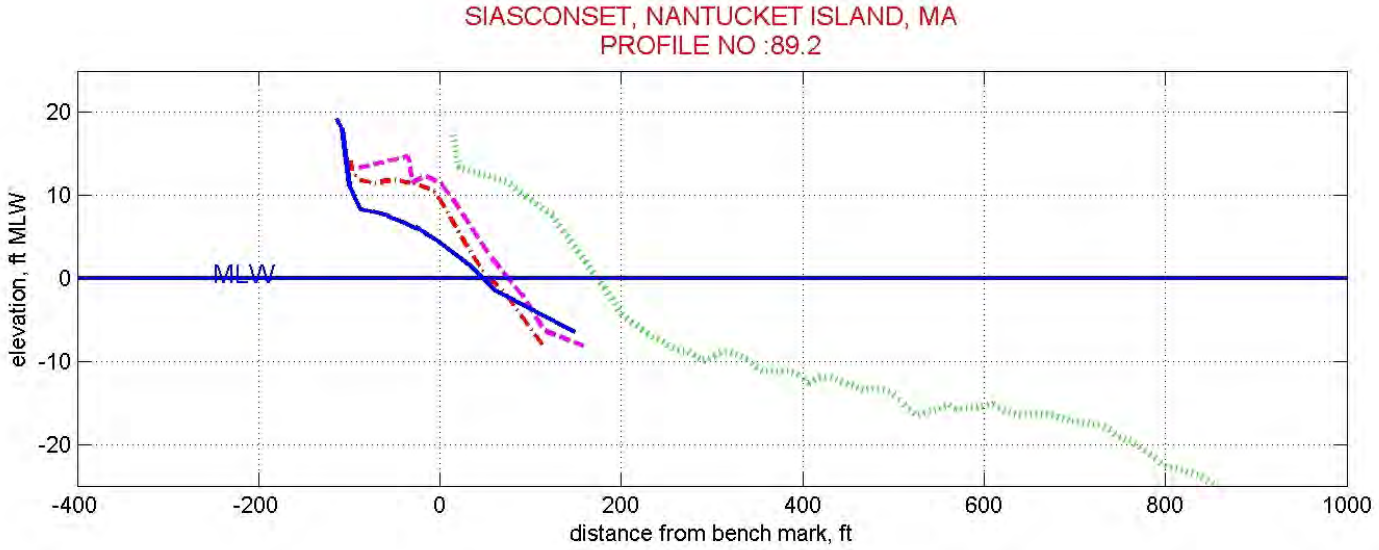
600
800
1000


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :89.2
elevation, ft MLW
MLW
distance from bench mark, ft
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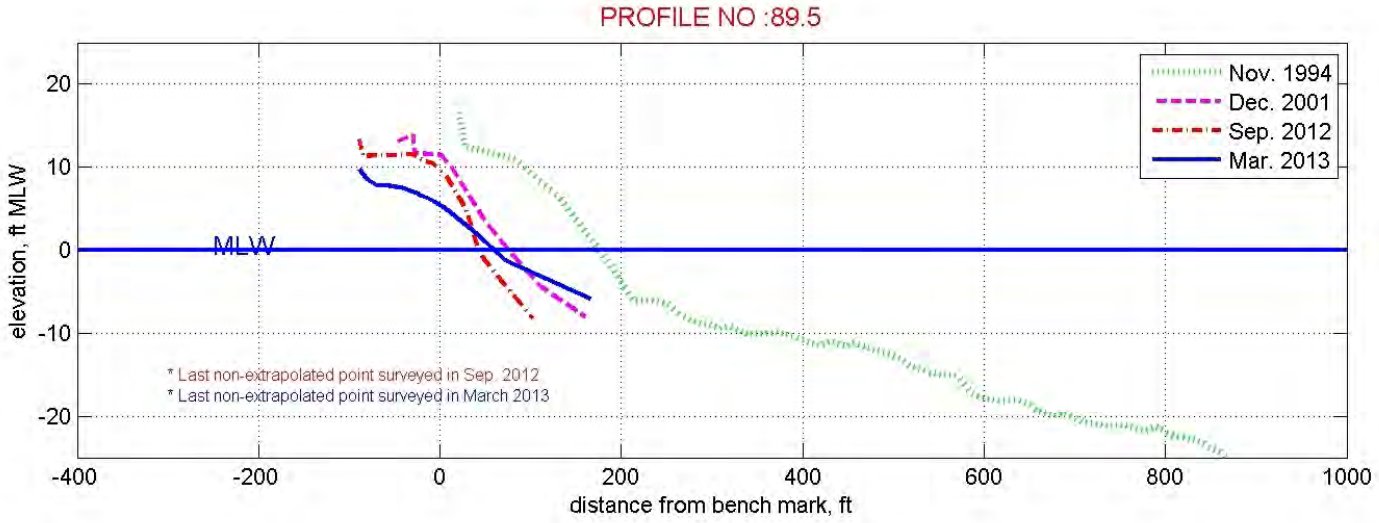
800
1000


PROFILE NO :89.5
elevation, ft MLW
MLW
distance from bench mark, ft
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013
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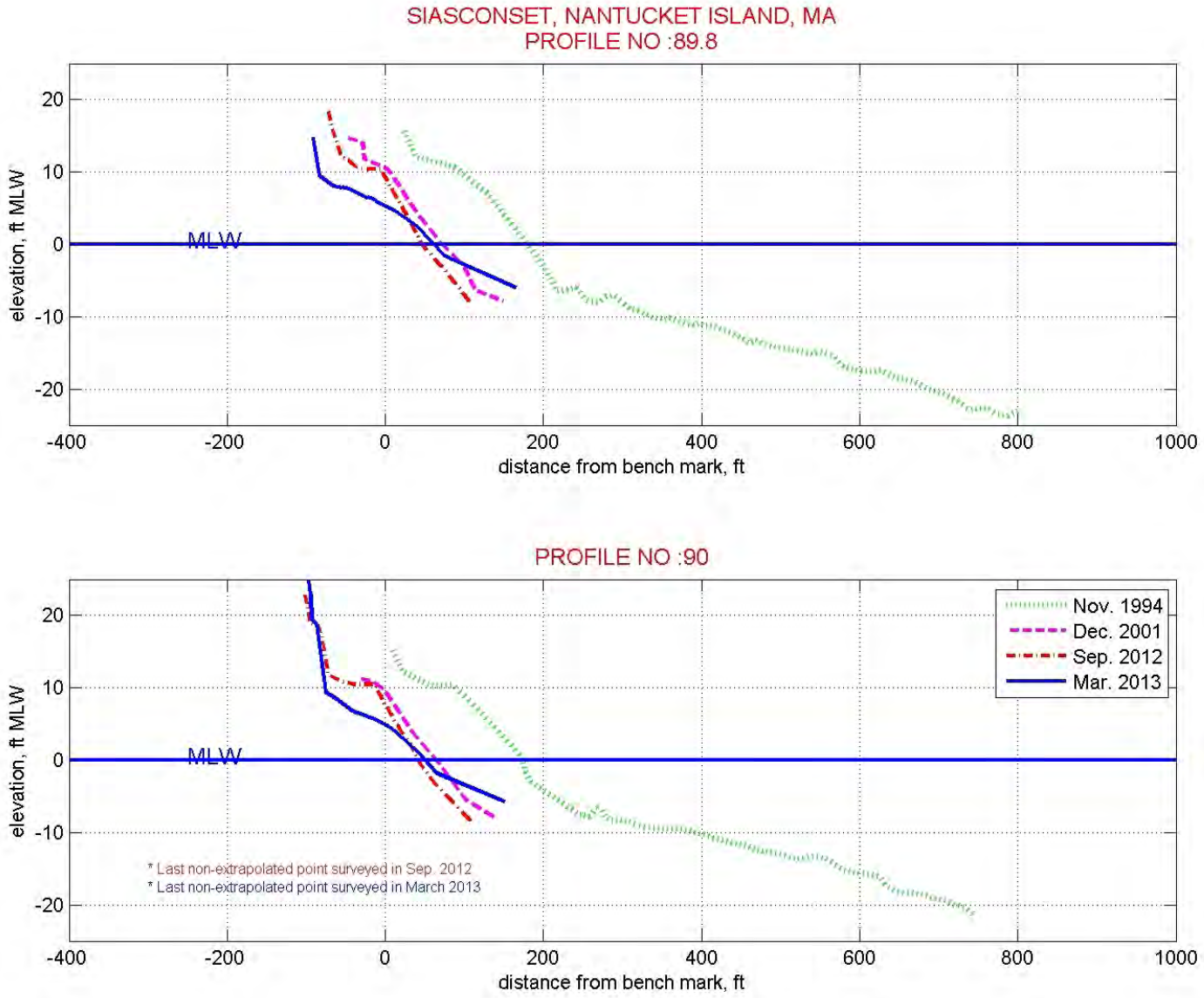
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PROFILE NO :89.8
elevation, ft MLW
MLW
distance from bench mark, ft
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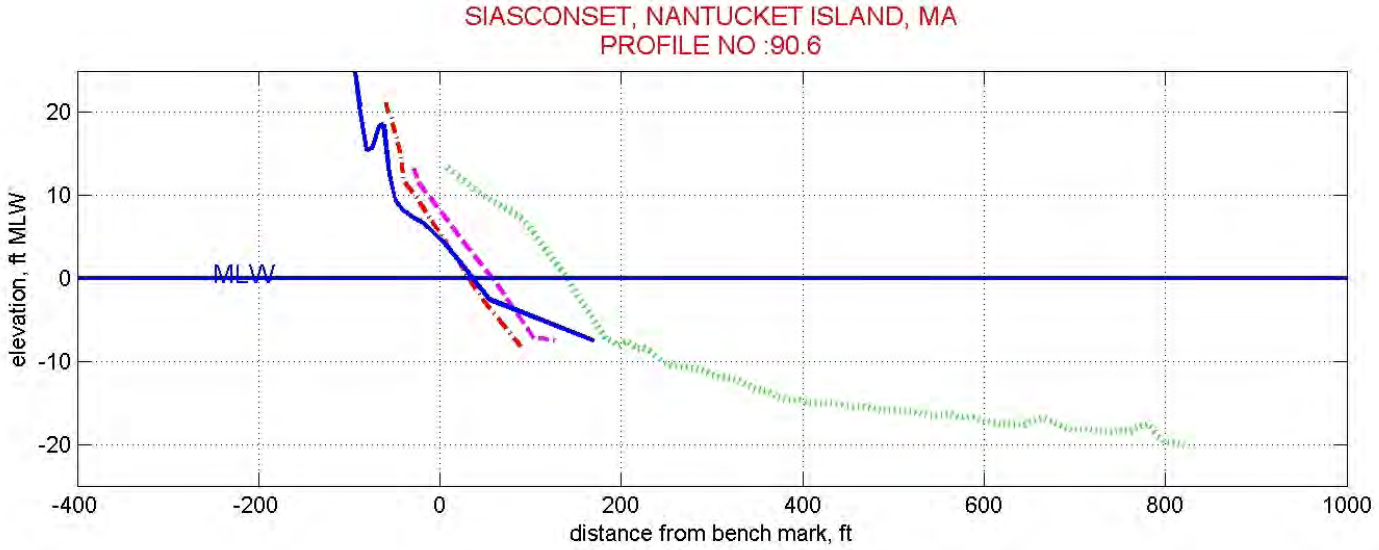
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :90.6
elevation, ft MLW
MLW
distance from bench mark, ft
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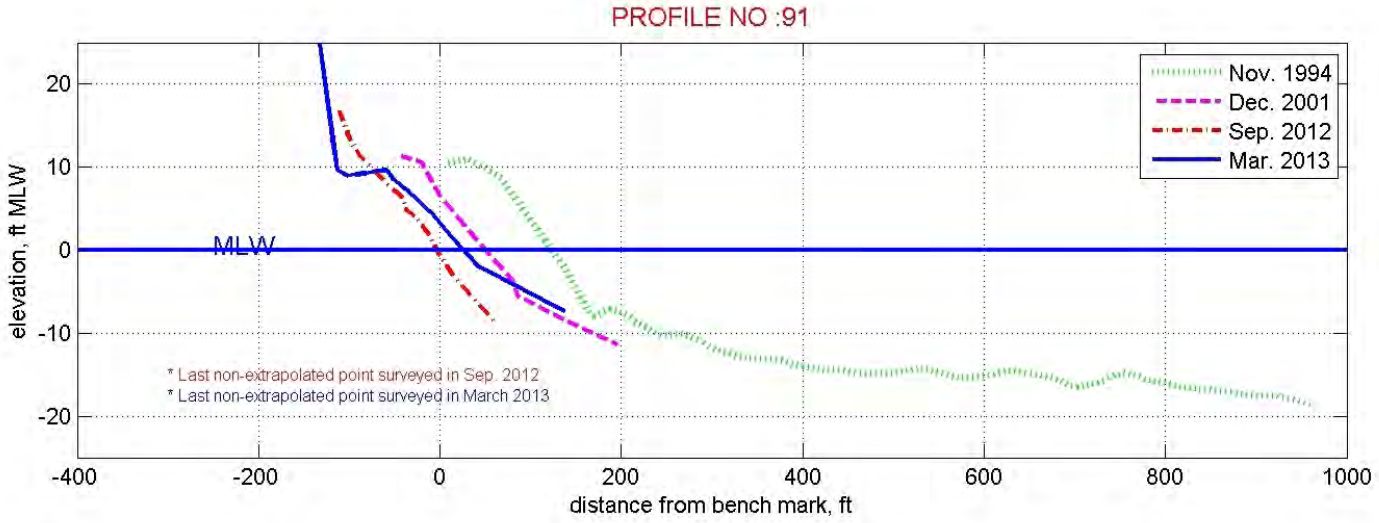
PROFILE NO :91
elevation, ft MLW
MLW
distance from bench mark, ft
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Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013
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-400
-200
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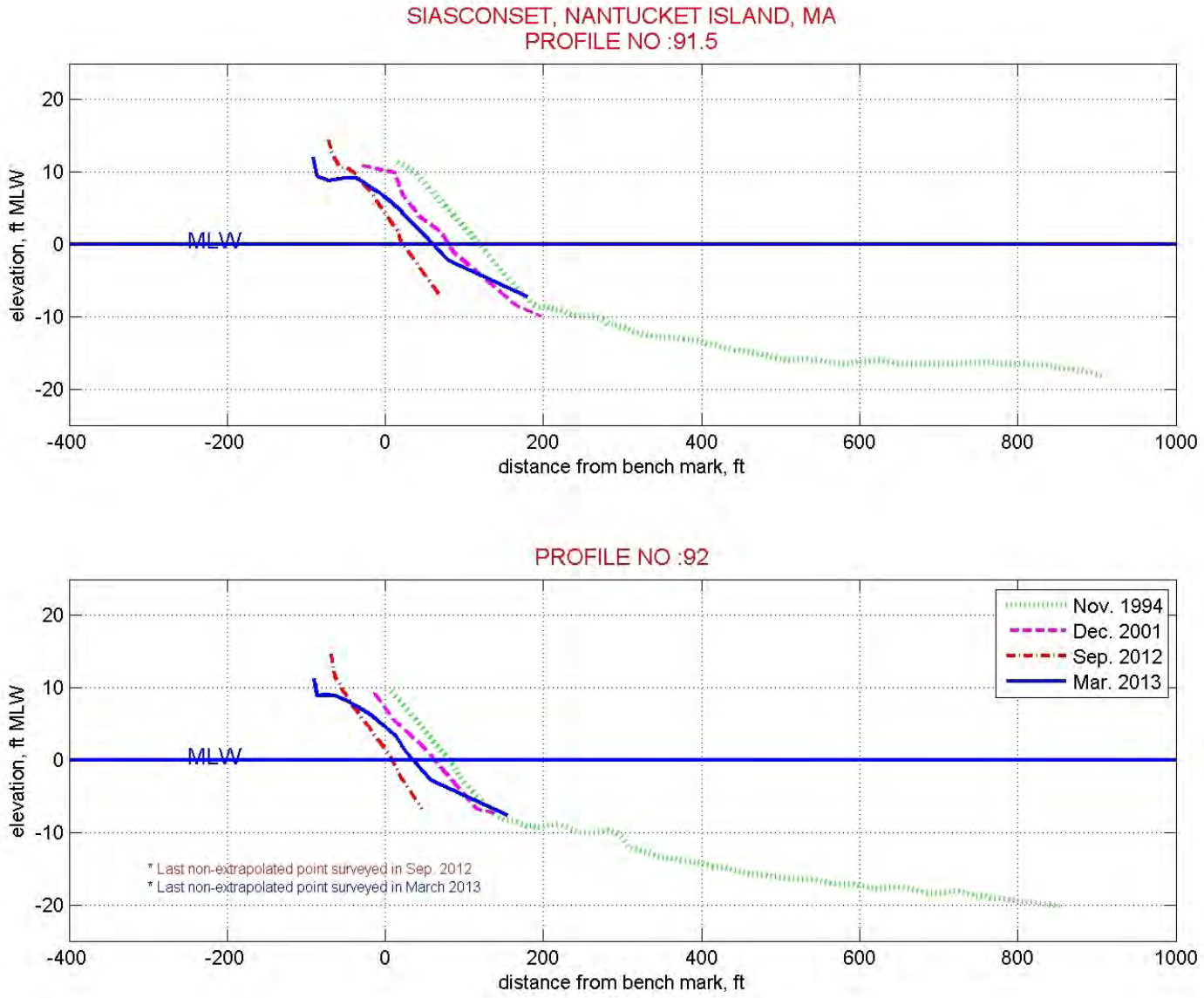
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elevation, ft MLW
MLW
distance from bench mark, ft
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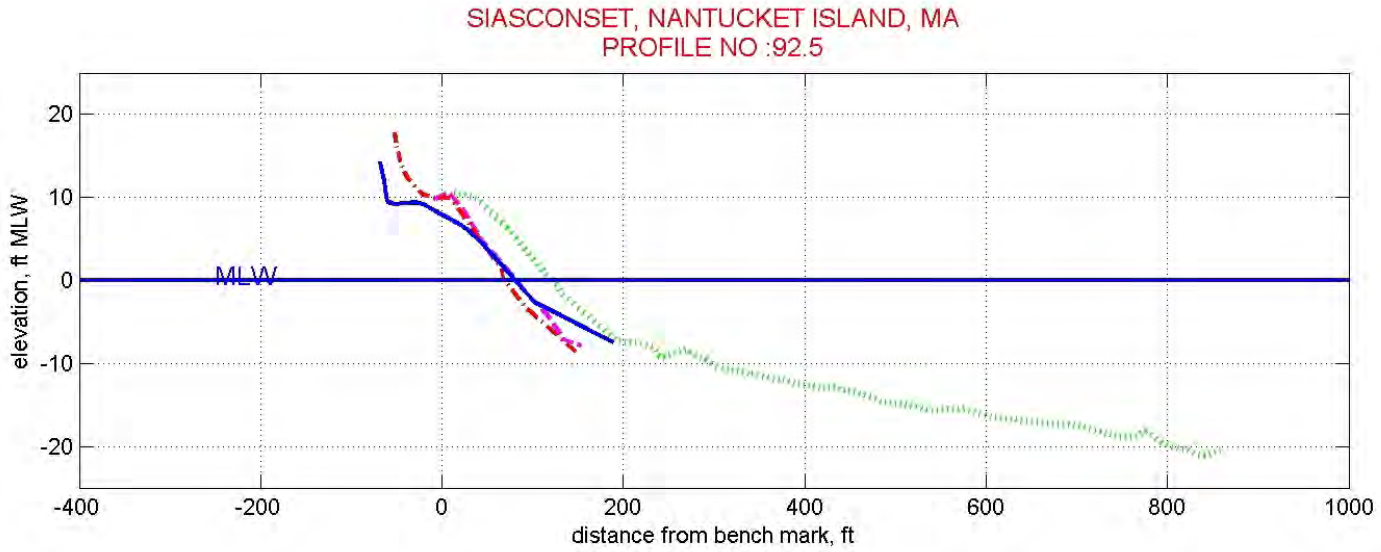
* Last non-extrapolated point surveyed in March 2013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distance from bench mark, ft
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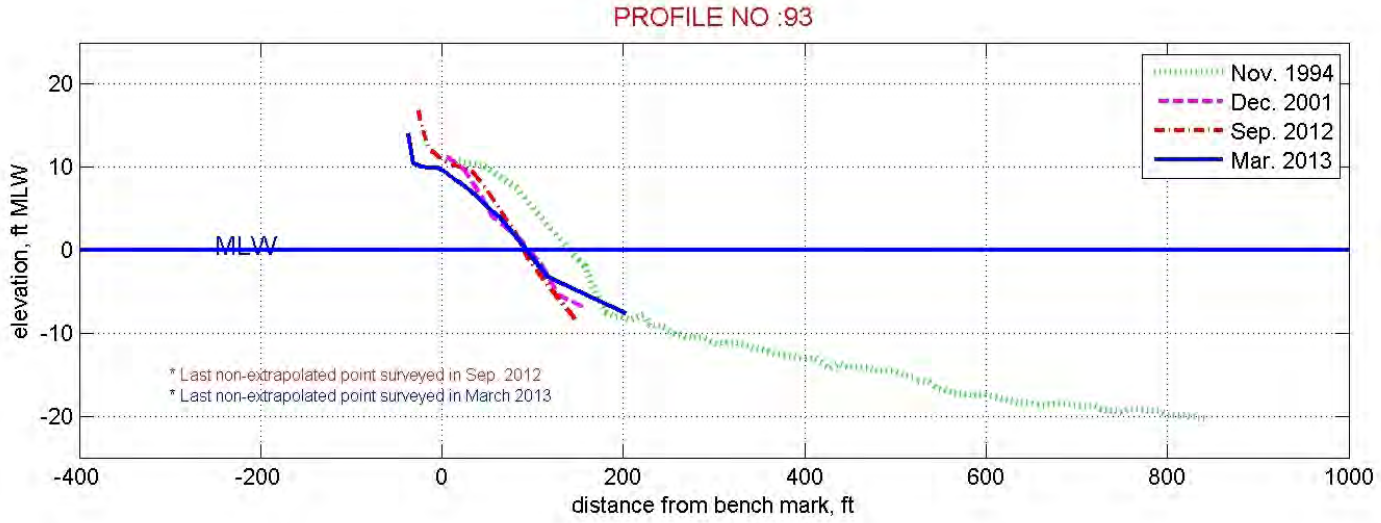
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MLW
distance from bench mark, ft
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Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013
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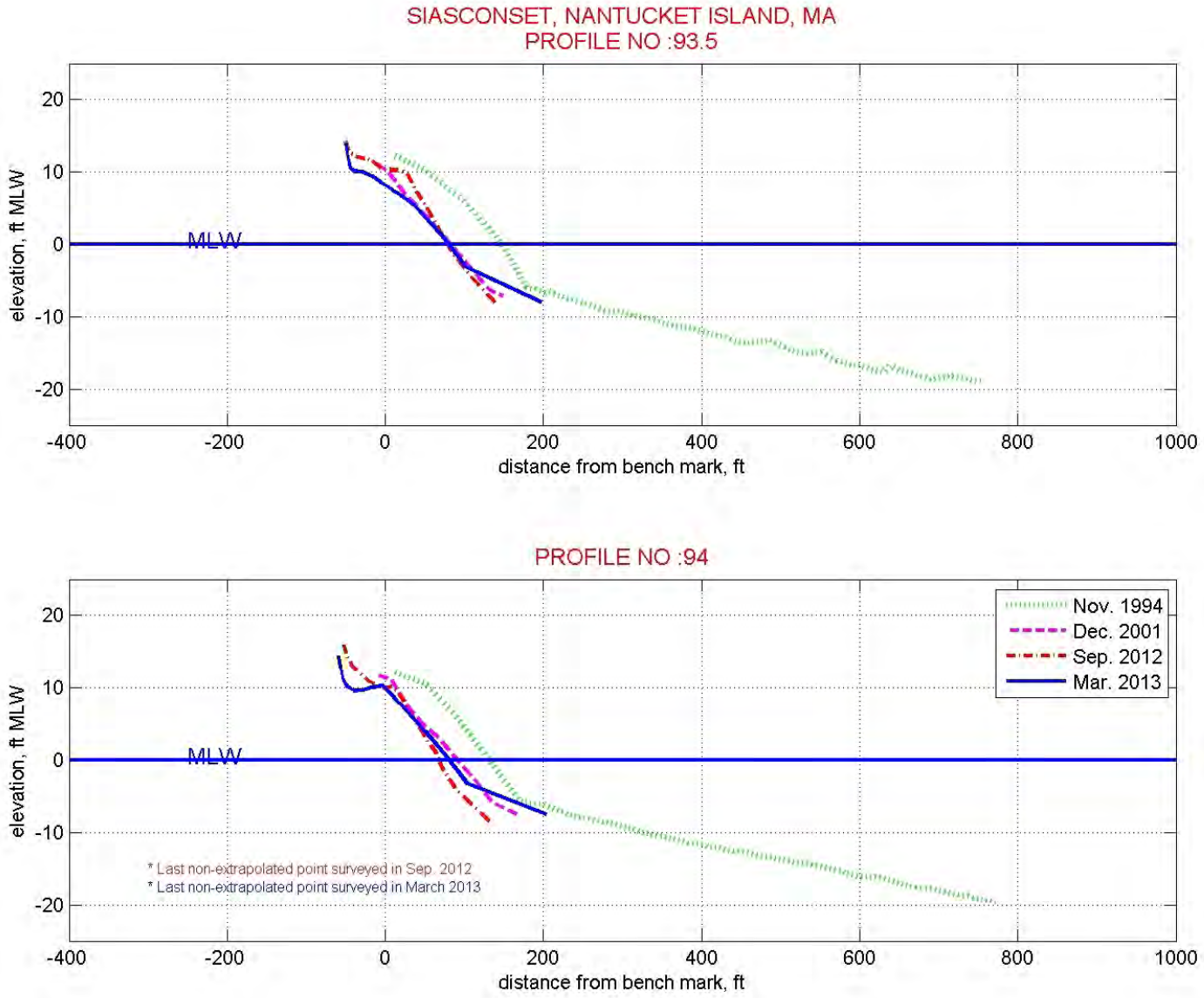
SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :93.5
elevation, ft MLW
MLW
distance from bench mark, ft
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Dec. 2001
Sep. 2012
Mar. 2013
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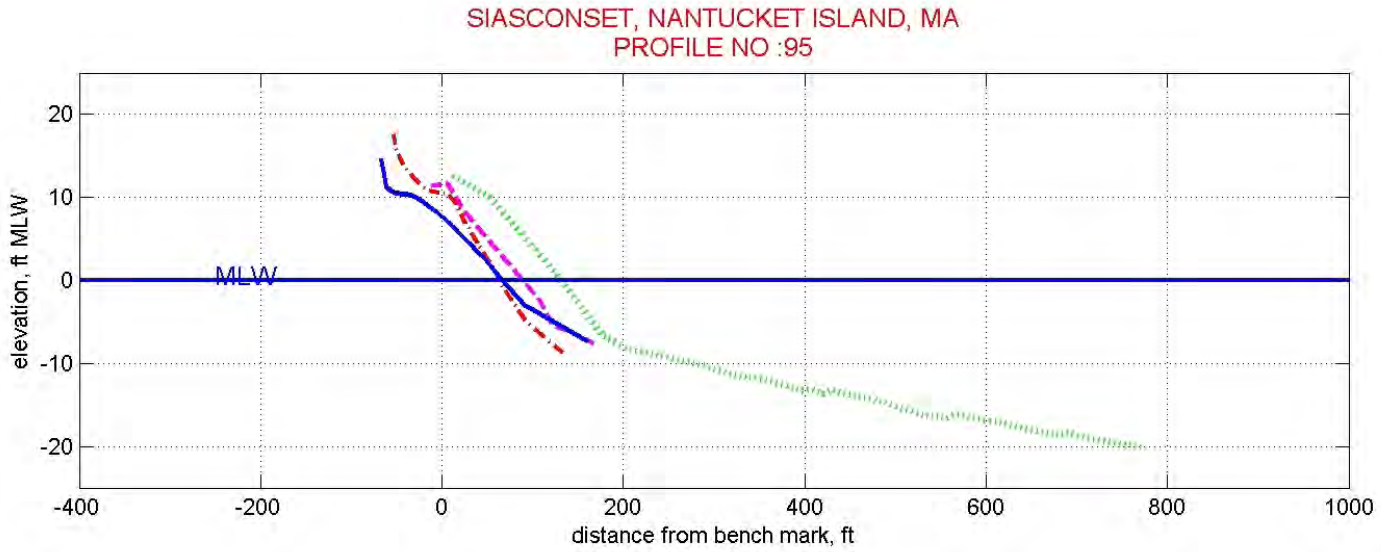
* Last non-extrapolated point surveyed in March 2013


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :95
elevation, ft MLW
MLW
distance from bench mark, ft
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-10
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-400
-200
0
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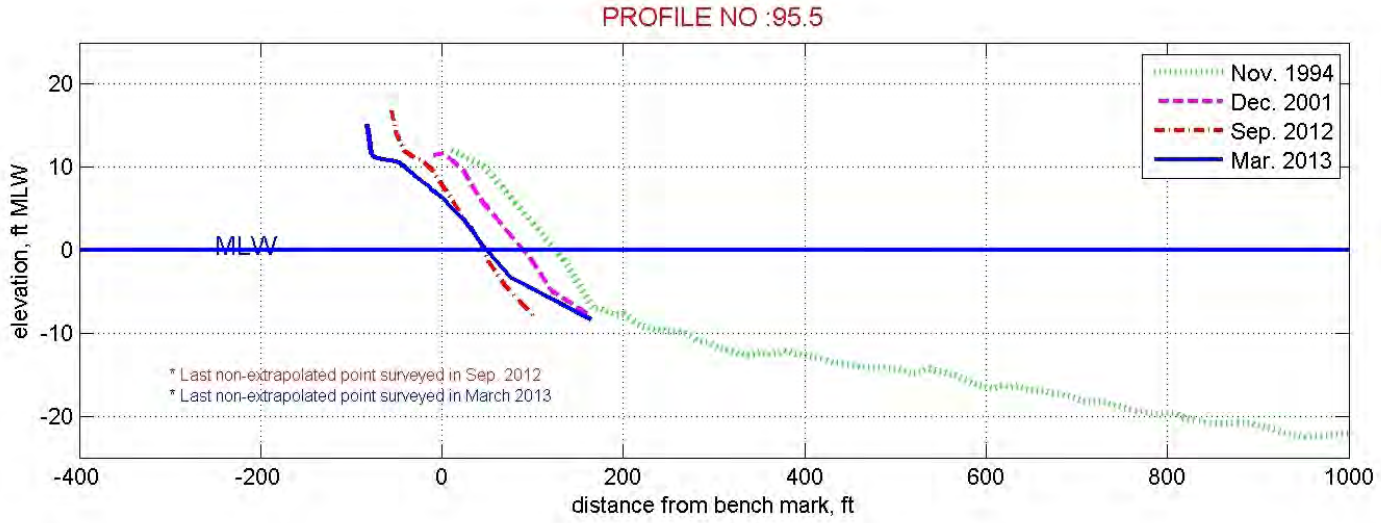
800
1000


PROFILE NO :95.5
elevation, ft MLW
MLW
distance from bench mark, ft
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Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013
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10
0
-10
-20
-400
-200
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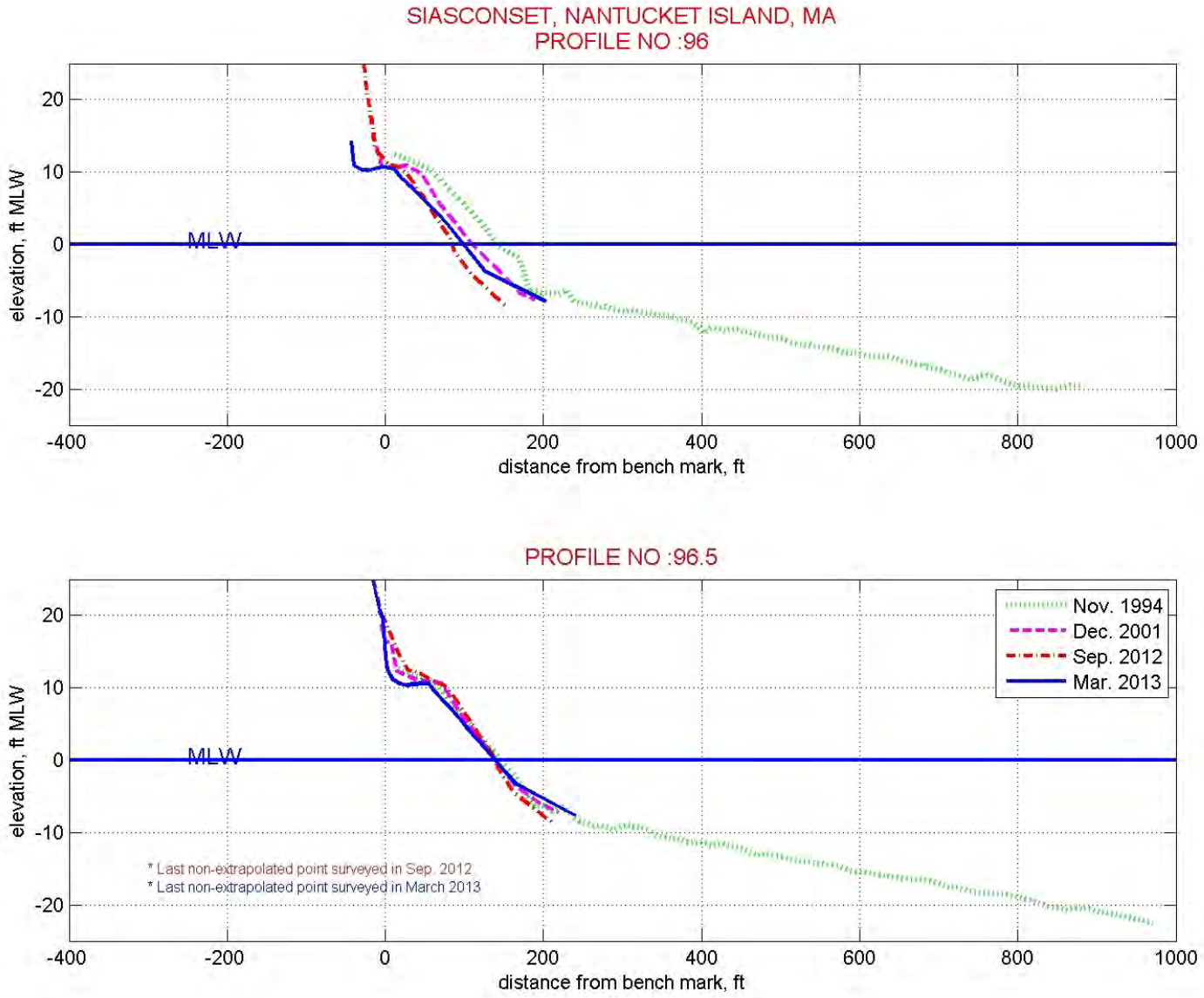
200
400
600
800
1000


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :96
elevation, ft MLW
MLW
distance from bench mark, ft
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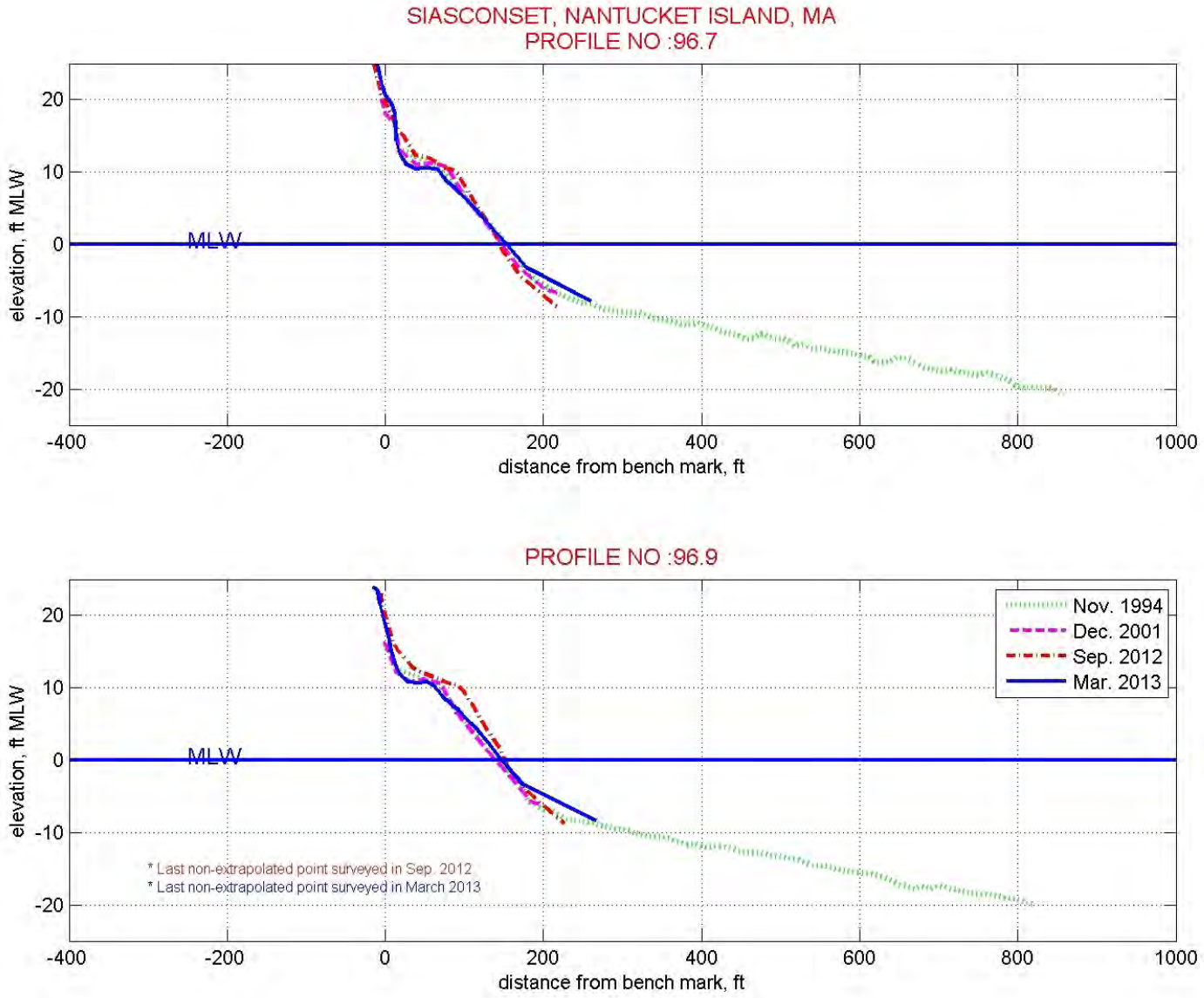
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :96.7
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MLW
distance from bench mark, ft
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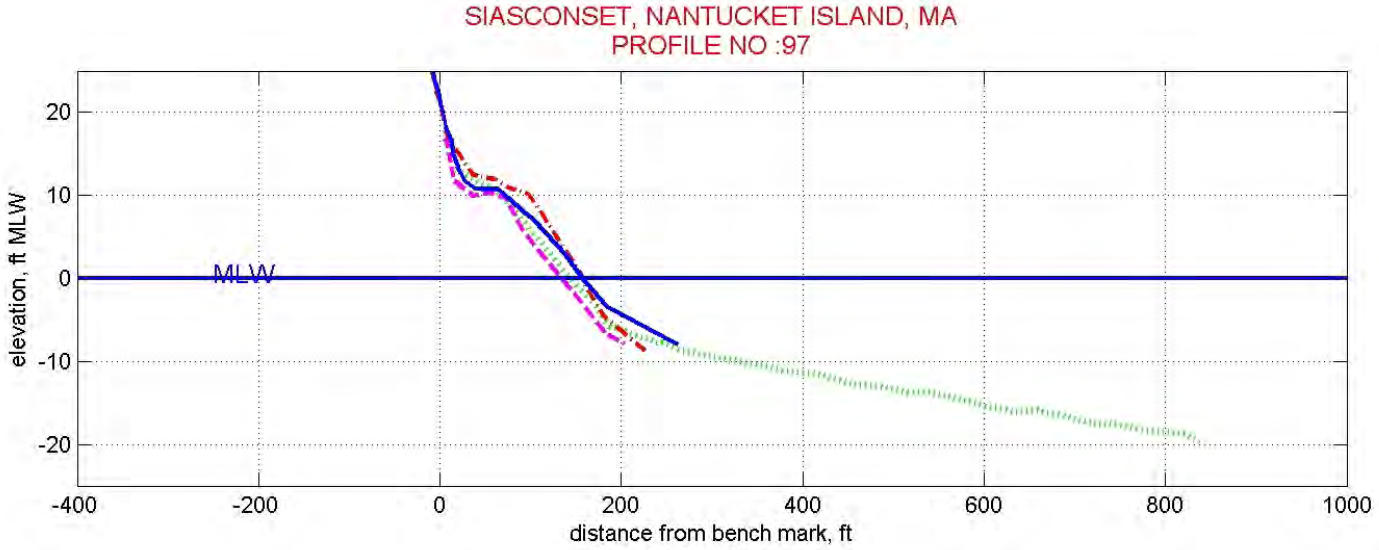
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :97
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MLW
distance from bench mark, ft
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0
-10
-20
-400
-200
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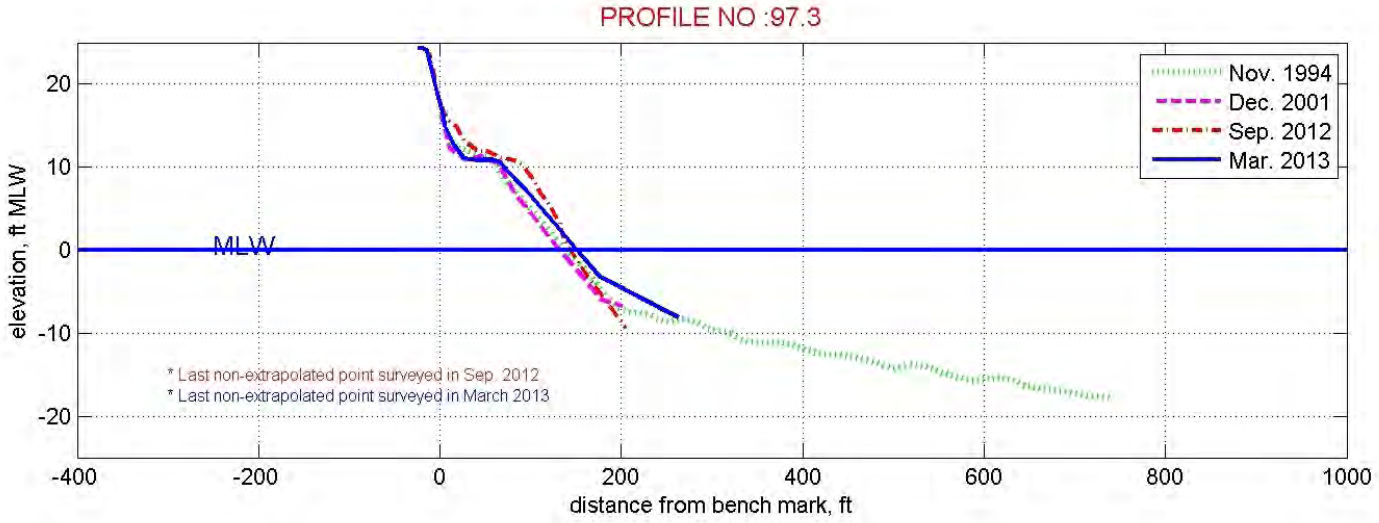
200
400
600
800
1000


PROFILE NO :97.3
elevation, ft MLW
MLW
distance from bench mark, ft
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013
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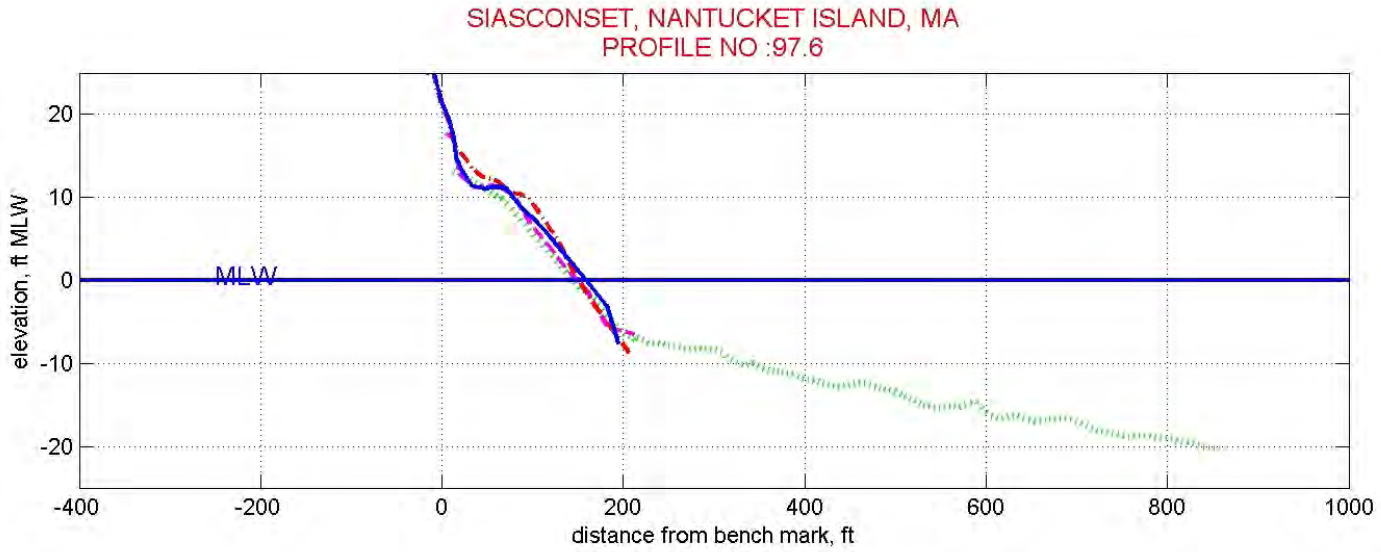
0
-10
-20
-400
-200
0
200
400
600
800
1000


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :97.6
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distance from bench mark, ft
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-400
-200
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400
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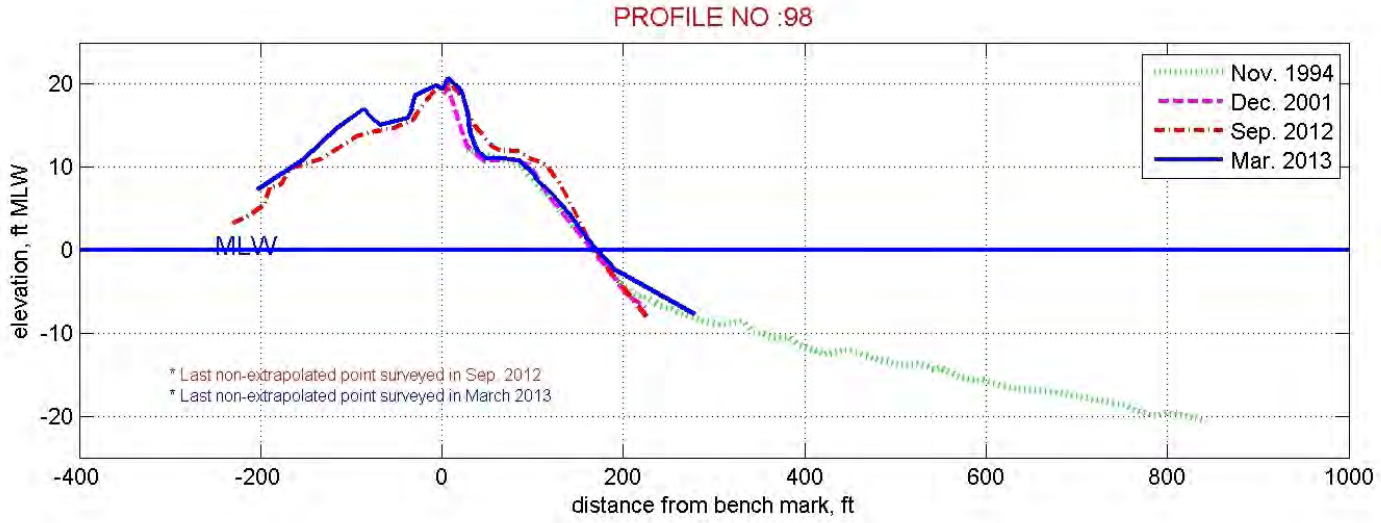
800
1000


PROFILE NO :98
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MLW
distance from bench mark, ft
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013
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0
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-20
-400
-200
0
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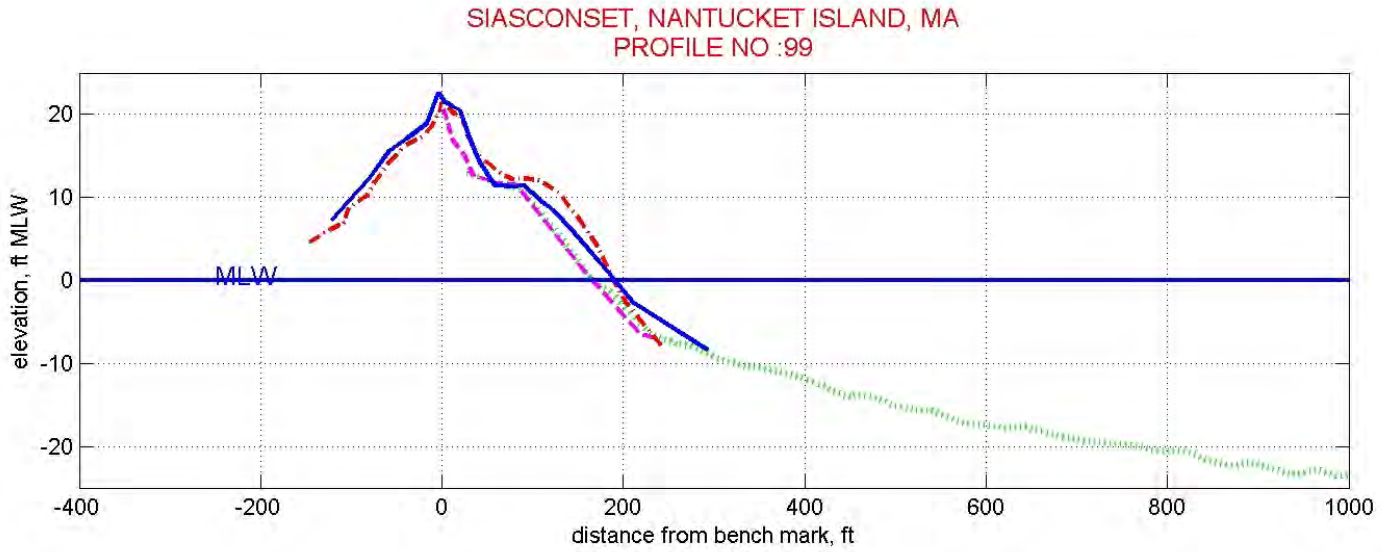
400
600
800
1000


SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :99
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MLW
distance from bench mark, ft
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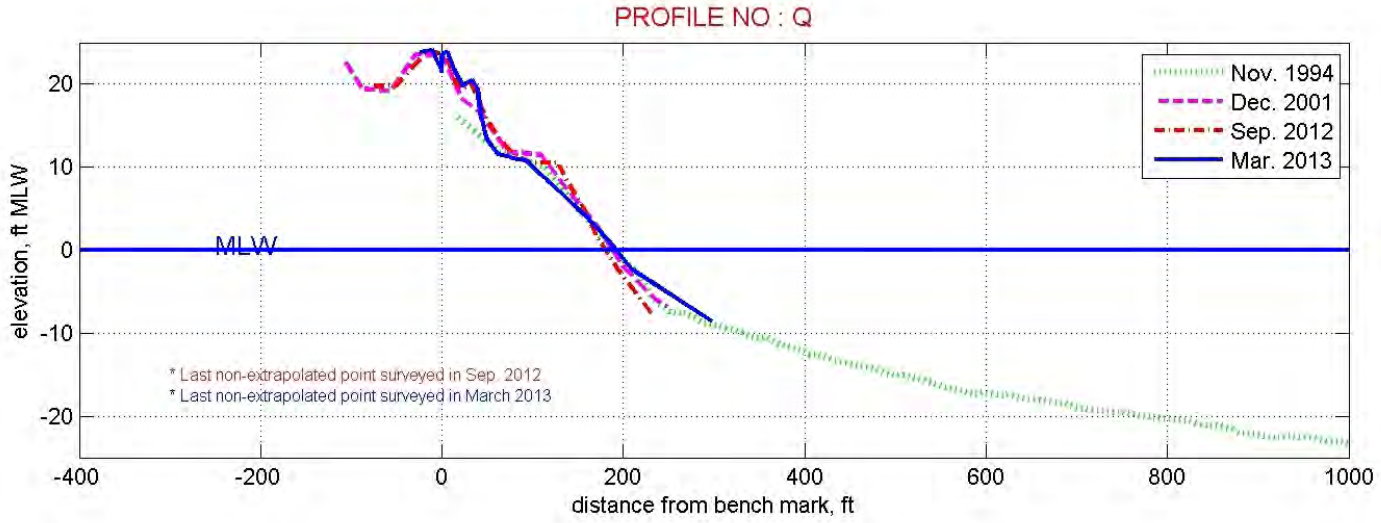
0
-10
-20
-400
-200
0
200
400
600
800
1000


PROFILE NO : Q
elevation, ft MLW
MLW
distance from bench mark, ft
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013
20
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-20
-400
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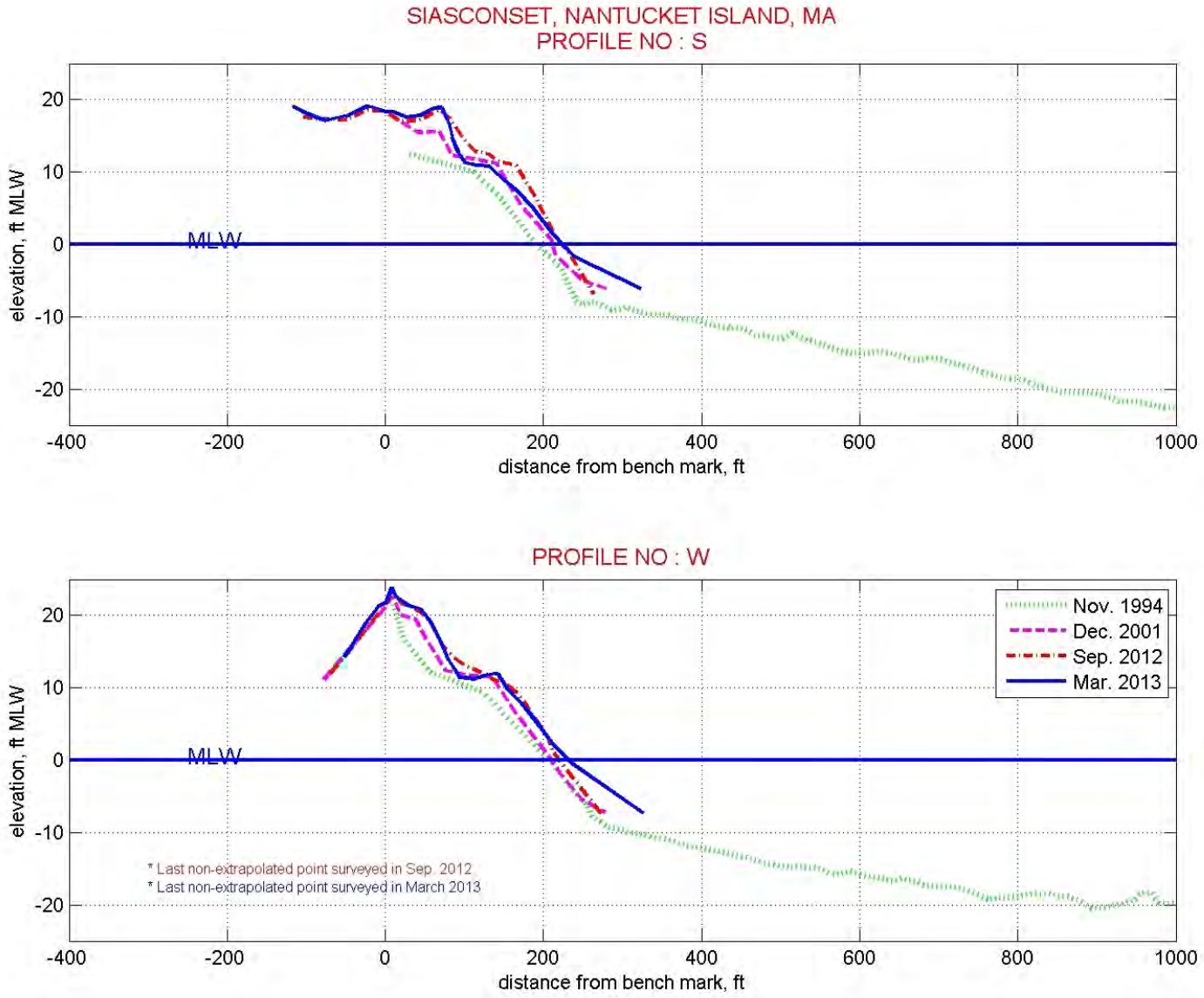
SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO : S
elevation, ft MLW
MLW
distance from bench mark, ft
PROFILE NO : W
Nov. 1994
Dec. 2001
Sep. 2012
Mar. 2013
* Last non-extrapolated point surveyed in Sep. 2012
* Last non-extrapolated point surveyed in March 2013

Letter of Transmittal

81 Technology Park Drive
East Falmouth, MA 02536
Tel. (508) 540-8080
Fax. (508) 540-1001

To: Siasconset Beach Preservation Fund
18 Sasapana Road
Nantucket, MA 02554

Date: 8-1-13 **Job No.** 2000-0162 **Trans. No.** WHG-0083

Via: ☐ **Mail** ☒ **Email** ☐ **UPS** ☐ **Other**

Phone:

Fax:

Re: 60th Quarterly Report March 2013

☐ **Plans** ☐ **Copy of Letter** ☐ **Disks** ☐ **Photos** ☒ **Report** ☐ **Photocopies** ☐ **Other**

We are sending the following items:

Originals	Date	No.	Description
	8/2013	0	60th Quarterly Report March 2013

Remarks:

cc:

By: Nadine Sweeney